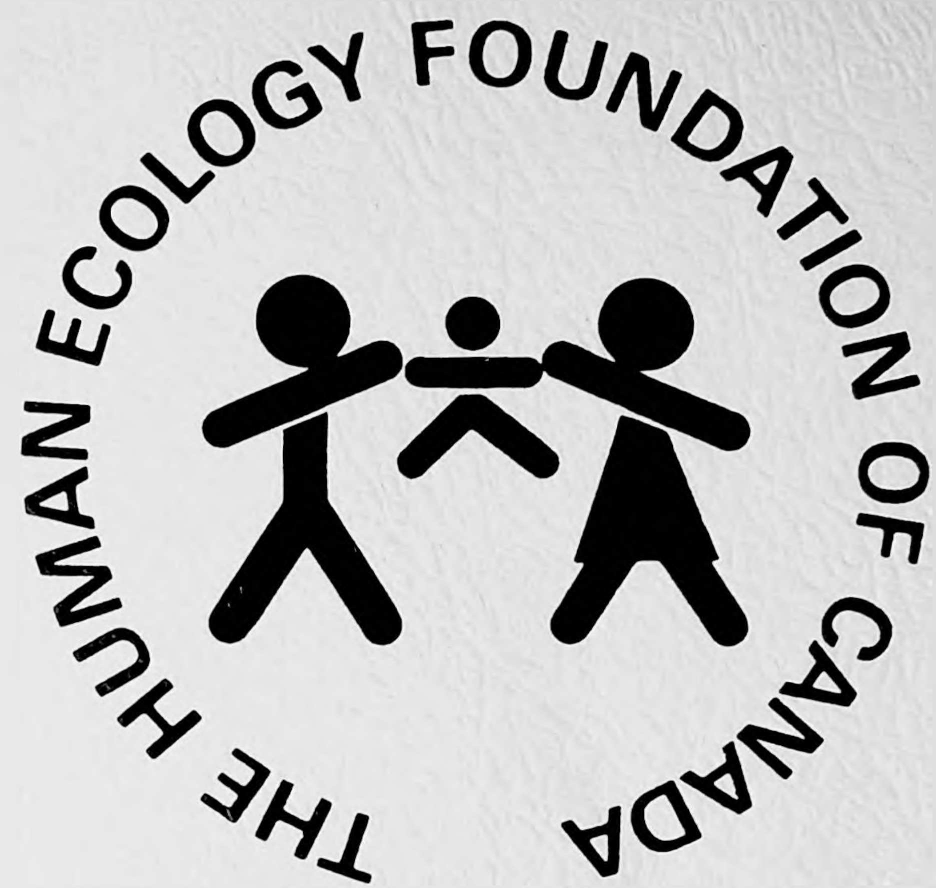
THE HUMAN ECOLOGY FOUNDATION OF CANADA

COMMON SENSE FOR THE SENSITIVE

The Human Ecology Foundation of Canada

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COMMON SENSE FOR THE SENSATIVE

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THE HUMAN ECOLOGY FOUNDATION OF CANADA

The objectives of the Foundation are as follows:

1. To assist the individual who is sensitive to a variety of environmental chemical exposures, to live dynamically, safely, and happily in the midst of an industrially and chemically oriented society. This will involve providing information so that the individual can obtain naturally grown, less contaminated foods, instructions regarding the erection of new homes, processing of foods, selection of fabrics, etc.

2. To encourage the active interest and participation of scientifically trained personnel to provide diagnostic techniques and therapeutic measures for the successful management of the chemically susceptible person.

3. To provide the means for free exchange of information obtained from continuing ecologic research in order to further the interest of medical, scientific, educational, and charitable organizations in human ecology.

4. To establish scholarships and endowments for the purpose of promoting the objects of the Foundation.

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Past editions of this book did not acknowledge by name those whose efforts originally made it possible. We do so now, in gratitude.

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PREFACE

The purpose of this edition of Common Sense for the Sensitive is, as it was for the first two editions, to provide a basic handbook for patients newly launched on the road to ecological health. It attempts to introduce the concepts of human ecology and of ecological medicine, and to outline ways to cope with the immediate environment (the house) and with necessary changes in diet and food preparation.

The present edition has been completely reorganized and a great deal has been rewritten. The section on ecological medicine was written by Dr. John Maclennan, Medical Director of the Human Ecology Foundation of Canada. The section on housing was the responsibility of Bruce Small, P.Eng. Many people contributed to the section on foods; the editor organized it. Special thanks to Joyce Mulvihill, Estelle Drolet and Walter Hammant for valuable suggestions and contributions.

R.W. Vince, editor
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I

ECOLOGICAL MEDICINE

1. HUMAN ECOLOGY AND ALLERGY

Generally speaking the term allergy refers to diseases such as hay fever, asthma, infantile eczema and some other selected cases of digestive complaints and chronic rhinitis. Usually, any other complaints experienced by patients are considered to be unrelated to the allergic process and to be caused by other mechanisms such as nerves. The above diseases must be confirmed by laboratory immunologic tests to be accepted as being "allergic". Professionals and laymen have been taught to believe in "compartmentalized" medicine, whereby symptoms produced in various organ systems are separate entities, and that if no cause can be found for symptoms then they are considered to be nervous in origin and are treated accordingly with tranquilizers, sedatives, analgesics, etc., and/or psychotherapy. On the other hand, there is one circulation system which bathes all tissue cells of the body, bringing all nutrients, insults as well as defences, to the cells. Clinical ecology proceeds on the premise that in the hypersensitive individual, all reactions, no matter how bizarre, unusual or unexpected, are related, unless or until proven otherwise.

The definition of some terms may assist you in understanding the newer ecologic approach to medical problems, particularly those of a chronic, long standing and complex nature.

Human Ecology refers to the study of man's relationship to the entire environment including everything that he inhales, both particulate, such as dust, mould spores, pollens, etc., and gaseous, such as smokes, fumes and odours. Other exposures include everything that one eats or drinks, that comes into contact with the skin, or is injected into the body, such as insect bites, drugs, etc. The commonest causes of illness are hypersensitivities to particulate inhalants, chemicals, including drugs (because most are derived from fossil fuels) and foods. Other exposures which may be involved to a lesser degree, include those to heat, cold, light, sound, wind, barametric pressure, and possibly high frequency radiation. Due consideration must be given to psychologic stress related to economic, political and interpersonal relationships. The proper amount of stress in our lives is stimulating and challenging to our natures and we thrive and grow by adapting successfully to these pressures, but, if we maladapt to environmental stress, we become ill. The diagnosis, treatment and management of the symptoms and diseases caused by this maladaptation to any or all environmental exposures comprise the field of Clinical Ecology.

From an ecologic point of view consecutive development of new manifestations of disease occurs throughout the lifetime of the hypersensitive individual. The longer the disease is allowed to persist, the more likely it will be that eventually multiple causes will produce multiple symptoms in many different organ systems of the body. A good example is that of an infant born of hypersensitive parents, who is immediately weaned and placed on cow's milk formula. The baby develops colic and spitting up or vomiting and diarrhea for several months. This may disappear and be followed in a few months or a year or so with respiratory symptoms such as winter colds; or there may be signs of retarded physical and mental development or of hyperactivity. Later on in the teens and twenties, hay fever, asthma, rheumatic pains, stomach upset, headache and fatigue may appear. By the time this person reaches 30 or 40 years of age he or she is chronically ill with multiple complaints and has made the rounds of many doctors and is taking several different medications on a daily basis. Most or all of the laboratory tests are negative for organic disease and therefore the symptoms are frequently labelled as "nervous" in origin. The individual may become discouraged and depressed because no reason for his symptoms can be found and no one, including members of the family believes that he is really sick but that the symptoms are being imagined.

2. ECOLOGIC ORIENTATION

The general term of Ecology refers to the study of the mutual relations of living things to their environment and to each other. Therefore, there is an ecology related to insects, birds, animals, bacteria and other living organisms. In a similar fashion human beings have an ecologic relationship with all the different things which we breathe, eat, drink, or touch, even with changes in temperature and weather. This relationship is affected as well by the nervous and physical stresses and strains of everyday life.

Over the centuries since his origin on the planet, man has adapted quite successfully, physically and mentally, to changes in his environment. Some animals and other organisms have failed to adapt successfully, and consequently they have disappeared from the earth. Not all people adapt properly and this results in the development of ill health and disease.

Several generations ago our economy was principally based on agriculture and human existence was relatively simple, uncomplicated and under our personal control. The family and community units were largely self-sufficient and very few commercial items or materials were required to fulfill their needs. All the cooking and most of the household equipment and furnishings, clothing, and furniture were made in the home. Homes were heated with wood or coal and not with gas or oil furnaces as is the case today. The population was largely rural, and transportation and farm work was accomplished by means of oxen, horses or by train.

Since the early 1900's and particularly since World War II, the development and expansion of industrial and chemical technology has caused a tremendous demand for energy which is supplied mainly by fossil fuels and coal. The use of these fuels has resulted in gross contamination of both indoor and outdoor air through emissions from manufacturing processes, internal combustion engines and heating equipment. Some of the products of coal-burning equipment combine with normal components of the air to produce acid products which contaminate the fresh water lakes and destroy the fish.

The technological revolution has resulted in massive research and the production of new chemical compounds. Some sources say that up to 5000 new chemical products are introduced into our environment each year. Most of these are of synthetic origin and are derived from fossil fuels. Some of these products include plastic materials of all kinds, aerolized spray products which are propelled with freon gas, synthetic colours, flavours, drugs, food additives, household herbicides, clothing and cosmetics. Chemical products such as fertilizers, herbicides, and pesticides are used on a widespread scale in the cities and on the farms.

Clinical Ecology is that branch of medicine which is concerned with the diagnosis and management of ecologic illnesses which develop in those people whose bodies lose the ability to adapt successfully to overdoses of various environmental exposures. In other words, they have an inherited tendency to develop sensitivities. Each person possesses his or her own individual degree of sensitivity which will determine how sick he or she will become when exposed to different materials.

What are the causes of ecologic disease? They include anything that we breathe, such as particles of dust, mould spores, pollens, chemical fumes, gases, smokes and odours; any specific foods or fluids that we eat or drink, like milk, eggs, grains, sugar, coffee, oranges, peanuts, and artificial foods; drugs, and any chemicals which are included in the foods and fluids which we eat or drink, such as artificial sweetners, colours, flavours and preservatives.

The degree of clinical sensitivity possessed by any particular person is related to the extent of ecologic disease present in the parents and other members of their families, combined with the concentration and duration of exposure. When there is a strong history of ecologic disease present in the parents, especially if left uncontrolled and untreated, their babies are likely to develop some manifestations of ecologic disease at a very early age- even at birth. If the disease process in the infant is not corrected at this time of life, and is allowed to progress over the years before it receives attention, the child may eventually exhibit complex ecologic disease problems effecting multiple organs and producing a wide variety of complaints.

No organ system in the body is exempt from the effects of ecologic disease, and the manifestations may be considered bizarre and unexplainable according to conventional medical concepts. The variety of symptoms produced by different organ systems will vary with the degree of clinical sensitivity possessed by the individual. The mild to moderately sensitive person will have relatively few symptoms, which can be easily diagnosed and managed. The exquisitely sensitive patient may exhibit many different symptoms and may appear to "react to almost everything." This type of medical problem is usually very difficult to solve and some people are so sick that they may be unable to remain employed or cope with the usual responsibilities at home, or with school work. Some of the more common manifestations include chronic headaches, insomnia and chronic sleepiness, hyperactivity, lack of concentration, poor memory and learning disability effecting both children and adults, manic depression and schizophrenia. General body symptoms can include chronic fatigue and exhaustion, chronic rheumatic pains affecting the muscles and joints, chronic indigestion, recurrent vaginitis and bladder infections, and chronic skin complaints. Symptoms effecting the respiratory system include hay fever, asthma, frequent colds, particularly in the winter months, and year round nasal and throat complaints. There are some people who exhibit symptoms related to the cardio-vascular system such as irregular and fast heart beat and palpitations, as well as phlebitis and varicose veins. The symptoms will vary with each person and are not necessarily present on a daily basis but may occur intermittently. Those patients who possess and exquisite degree of sensitivity will have chronic symptoms all the time.

The symptoms produced by the disease are not dependent on the type or route of the exposure. For example, inhaled particles, such as dust, mould spores and pollens are most likely to produce symptoms affecting the eyes, nose, throat and chest. They may also effect the central nervous system or digestive tract causing indigestion, diarrhea, constipation, and abdominal pain. In similar fashion, the ingestion of foods or chemicals may cause symptoms reflected in the brain, the skin, the respiratory system, or the bones and joints. Food and chemical sensitivities are more likely to produce a wide variety of symptoms affecting many different parts of the body. One type of exposure may cause symptoms to develop simultaneously in several different organ systems.

The diagnosis of ecologic disease is made principally by obtaining a very detailed history of the medical complaint from the first appearance of symptoms, always watching for evidence of a cause and effect relationship which will help to identify the specific causes. A strong family history of ecologic disease in association with the typical characteristics of the individual's symptoms will identify the presence of ecologic disease even before the challenge testing is commenced.

All of the test procedures used are of a challenge nature; that is, if the person is sensitive to the material they are exposed to, either by nasal inhalation, sublingual or skin test administration, they will exhibit some form of reaction either with subjective or ibjective manifestations. Sensitivity to particulate inhalants is identified by means of the nasal inhalation test. When a positive reaction occurs, with symptoms of sneezing, runny nose, coughing or shortness of breath, the exact treatment dose for each test material is established by means of serial dilution titration. The identification of food and chemical sensitivities is made by means of sublingual or skin testing or by ingestion.

Some people are so sensitive to any food and chemical exposures that it is impossible to solve their problem in an office setting. These people are suitable candidates for a total fasting investigation which is carried on in a special ecologic unit in a hospital. These units are specially constructed and maintained in order to keep them completely free of chemical contamination. For a period of from 5 to 7 days the patient's diet consists only of clean spring water. When the patient's symptoms are caused by food and chemical sensitivities the symptoms will completely disappear after a few days. The food sensitivities are then identified by having the patient eat individual foods three or four times a day and carefully observing any symptoms which may be produced by these separate feedings. Upon discharge, the major reacting foods are excluded from the diet for a minimum period of six months and perhaps longer, depending upon future testing of these foods, and the remaining foods are rotated on a 5 day basis.

It is usually found that certain major environmental exposures are controlling factors of the ecologic disease process. There may be quite a number of other associated minor sensitivities playing a part, but these usually disappear and lose their affect when the major causes are either avoided or properly treated. The successful control of ecologic disease depends on the simultaneous management and treatment of all the sensitivities. The particulate inhalants are controlled by means of injection treatment with the specific materials, along with proper environmental control. Food sensitivities are managed by means of avoidance and rotation of the diet. The control of chemical susceptibility is the most difficult part of the management of ecologic disease. Avoidance of all major exposures is absolutely obligatory, and treatment with chemical solutions is only used as a last resort. Eventually a totally chemically clean home environment must be achieved. This may take months or even longer to achieve because of limited financial resources and the availability of suitable replacement materials, such as fabrics made from natural fibres, cotton, linen, silk and wool. It is usually necessary to replace fossil fueled heating systems with some form of electric heat.

It is important that the entire family group be involved in the ecologic management. Those members of the family who are suffering from ecologic disease will require the cooperation and support of the other members of the family. Since there is an hereditary factor involved in this disease, it is quite possible that other children in the household may develop the disease over the years if the exposures continue indefinitely. The institution of ecologic management in the household should prevent the development of the disease in other members. Also, if one member of the family is sensitive to tobacco smoke then any other members who smoke, as well as visitors, must refrain from smoking in the house. In a similar fashion, no member of the household should use scented cosmetics. such as after shave, perfumes, colognes, personal deodorants, and hair sprays. All aerosolized and other strong cleaning agents, room deodorants, fabric conditioners, like Fleecy and Bounce, must be avoided.

The main objective of Clinical Ecology is to determine causes of illness and design a proper management program which will not only control the existing manifestations of the disease, but prevent development of sensitivities in the future. This is in contradistinction to conventional medicine which concentrates mainly on treating the symptoms of disease, thereby allowing the underlying disease process to persist. Exceptions are specific acute illnesses such as acute infections and surgical situations which are terminated by short term immediate therapy. Most chronic disease present in the population should be investigated from an ecologic point of view.

The successful management and permanent control of ecologic disease depends on the individual's desire to obtain good health. This goal can only be achieved by patience, persistence and self-discipline.

3. MEDICATIONS AND HOSPITALIZATIONS

Medications

A hypersensitive individual cannot use symptomatic medication on a regular basis without the prospect of developing a new area of chemical sensitivity, if one does not already exist. The chemically susceptible person is a very likely candidate for such an occurrence, and depending on the degree of individual susceptibility, will probably react to a variable number of therapeutic drugs. Chemically sensitive patients are more likely to develop drug sensitivities than those who are not so afflicted. All unnecessary exposures must be avoided, but what about situations where the use of medication is necessary, such as in the event of surgical procedures? The answer is to use as little medication for as short a period of time as possible. However, not all such patients will react to all forms of medications. Usually a suitable safe prescription or method can be found for treatment of severe illnesses. Milder illnesses should be treated conservatively with alkaline powders, fluids, bed rest, without the use of unnecessary medication.

In general, all hypersensitive patients, and particularly those who are sensitive to foods, should avoid oral forms of medication. Intravenous, subcutaneous or intramuscular are the preferred routes of administration. If oral medications are essential, use uncoloured tablets or capsules from which the powder can be removed and swallowed without the capsule. The coloured coating of other tablets must be removed by washing before being swallowed. All syrup preparations should be avoided because they contain sugar, synthetic dyes and flavours.

When analgesic or "pain-killer" drugs are necessary, uncoloured tablets such as Aspirin, Bufferin, 222, 282 MEP, or Codeine, gr½ can be used orally, if previous experience has proven that they are well tolerated. If these drugs cause reactions when taken by mouth, then hypodermic injections of Codeine, Talwin, Demerol or Morphine can be tried. Oftentimes only one or two doses are all that are needed during the immediate acute phase, after which conservative treatment with alkaline powders, applications of heat or cold, and rest will suffice to control the symptoms.

For minor procedures of short duration it is best not to use local anaesthetics or to use radio-opaque dyes for x-ray examination if at all possible. Hypersensitive individuals often react adversely to such medications. If their use is essential then an adequate covering dose of intravenous or intramuscular antihistamine should be given beforehand in order to lessen or perhaps prevent an adverse reaction.

Preventative dental care should be maintained regularly in order to prevent the development of disease or cavities which will require the use of local anaesthetic. It is necessary to learn from childhood to tolerate the discomfort associated with dental drills, etc. A sympathetic and co-operative dentist can modify his technique by using fewer and milder medications for some procedures such as rootcanals, etc.

When acute infections arise and which may require the use of antibiotics, Erythromycin or Tetracycline are preferred unless other varieties have been used previously without ill effect.

The best anaesthetics for short surgical procedures are intravenous Pentothal and Nitrous Oxide, whereas for longer procedures, the usual gas anaesthetics are used.

Hospitalizations

Patients requiring hospitalization should be admitted to a comprehensive environmentally controlled ecologic unit if one is available. When such a unit is not available, private accommodation can be obtained at no extra cost to the patient, provided the admitting doctor records on the chart that a private room is necessary for medical reasons. This allows the room and contents to be prepared to meet the needs of the chemically susceptible patient. The patient should provide his own cotton bed linen, pillow and clean spring water if these items are not supplied by the hospital. The patients should also provide his own food. The following list of instructions is placed on the patient's chart so that all ward personnel, doctors and visitors can comply accordingly:

1. The hospital room shall contain only fabrics and furniture which are made with natural fibers and materials, such as cotton mattresses and bed linen, wooden furniture, etc.

2. No synthetic materials will be allowed in the room, such as foam rubber, plastic covered furniture, etc.

3. Detach bathroom deodorizer and thoroughly scrub the tiles behind, for removal of all deodorant residue on tile and mortar.

4. Avoid the use of odoriferous cleansing agents in bathroom and the patient's bedroom. Use plain non-scented soap and water.
5. Ward personnel who attend the patient and all visitors must not wear hair spray, perfumes, colognes or strongly scented cosmetics of any kind.
6. The patient may use plain castile soap.
7. Only old magazines, books, newspapers will be allowed in the room. All freshly printed reading material must be avoided.
8. No flowers of any kind - natural or synthetic will be allowed in the room.
9. Smoking will not be allowed in the room by patient, visitors or hospital personnel.
10. The patient is not allowed to leave his private room for any reason, unless specifically ordered by the attending physician.
11. The door of the room must be kept closed when hospital cleaning procedures are being carried out in the adjacent corridor or ward. Do not use any deodorant sprays or other odoriferous materials near the entrance to the patient's room.
12. The windows must be kept tightly closed when an east wind is blowing, or when industrial fumes and odours can be detected in the air.
13. An A.M./F.M. radio is desirable with only metal or wooden cabinet or case.

The dietary pattern followed at home should be continued while in hospital unless otherwise prescribed by the doctor. If you have major severe food sensitivities it may be desirable to fast for a few days depending on the individual circumstances and according to the doctor's instructions. On admission there should be an immediate consultation with the dietitian regarding full details of your rotary diversified diet and the foods which are excluded from the diet. If you are admitted to an ecologic unit all of these details, as well as the provision of clean foods, are handled automatically by the ward personnel, otherwise it will be necessary for you to provide your own clean food during your stay in hospital.

In the event of major illnesses which require the use of intravenous solutions, only saline should be used. Corn sugar is contained in the glucose variety of solution, and it will cause severe reactions in corn-sensitive patients.

It is to be expected that the chemically susceptible patient will be adversely affected by the medications used in association with any investigation or surgical procedures. Any ill effects which do occur may improve with the use of oxygen for a variable length of time or as long as symptoms persist, and alkaline powders. A paper cone made from plain white paper should be used to administer the oxygen instead of using an odorous rubber mask.

4. THE ECOLOGIC MANAGEMENT OF PREGNANCY AND THE NEWBORN

The reason that people become allergic or hypersensitive to different exposures is that they have an inherited predisposition to develop sensitivities, and then, depending upon the dosage and duration of the exposure, they will develop sensitivities accordingly. It therefore is not surprising that the predisposed hypersensitive infant most frequently becomes sensitive to cow's milk, because this is the only major item in his diet for the first few weeks and months of his life. In order to illustrate the degree of overdosage involved in this case: if a medium sized adult were to consume a comparable amount of milk on a pound for pound basis, the adult would need to drink approximately 5 gallons of cow's milk in a day. This very important hazard in the infant's life is easily avoided by breast-feeding.

The immediate and future health of the unborn and newborn is determined largely by its genetic inheritance and the health and behaviour of the mother during her pregnancy. The behaviour aspect refers to whether the mother is a smoker or a non-smoker, whether she satisfies the cravings for certain foods that may develop during pregnancy, or whether she finds it necessary to use drugs for modification of moods or for other reasons. In the allergic family, the genetic inheritance refers to the inherited predisposition to develop hypersensitivities, which means that if the parents and/or their relatives manifest signs or symptoms of active hypersensitivity or allergic disease, then there is a strong possibility that their newborn will show either early evidence of hypersensitivity, or develop the disease at an early age. Generally speaking, the greater the degree of sensitivity and activity of disease in the parents and their forebears, the earlier that severe disease will appear in the infant. Occasionally the disease will skip a generation with the grandparents and their relatives showing evidence of disease, but the parent at the present time may be symptom-free. Even when this situation occurs, ecologic principles of management of pregnancy should be followed with the parent and the pregnancy. When only one parent exhibits active disease, then the child has a slightly less likelihood of developing the disease at an early age.

The prevention of disease is a much superior approach to human health than to try to correct the disease after it has become established. Therefore it is imperative that the mother should be as close to being symptom-free as possible at the time of conception, and the ultimate of course, is that both partners are symptom-free at this time. It should be explained to them prior to conception that both parents should undergo a complete ecologic investigation and stabilization of their hypersensitivities if the history of the parents of the family is strongly positive for allergic disease. By this means we are assured that the pregnancy will be established on a safe course insofar as the hypersensitive status of the infant is concerned.

Before planning a programme of ecologic management for a pregnancy, it is necessary to know what problems and specific sensitivities require our attention. It is also imperative that the presence of organic disease and psychiatric causes have been excluded first. An ecologic investigation is devoted to determining the various causes of symptoms. A young married woman of 22 is referred to us for diagnosis and treatment of hay fever and bronchial asthma. During the course of taking her history she indicates a desire to start having a family in the near future. Her family history indicated that her father had hives and hay fever, and her mother and grandmother had chronic headaches and chronic indigestion. The history also tells us that she had colic and eczema in infancy and early childhood. She also had nosebleeds, bedwetting and a few nightmares until she was 8 years of age. This was followed by the development of hay fever and later on of bronchial asthma. Around puberty she developed sporadic headaches which were becoming more frequent and severe during the last five years. Also in recent years she had developed gaseous indigestion.

Our ecologic investigation proved that she was clinically sensitive to the following particulate inhalants: house dust, mould spores, cat hair, feathers, grass and ragweed pollens. She was placed on a programme of hyposensitization or injection treatments with all of these inhalant antigens in order to reduce her sensitivities to these causes. She received instructions for proper control of dust in the home, and to get rid of the family cat.

Our studies also showed that she was sensitive to a number of foods and some of these reactions were very strong, and she was instructed to avoid wheat, milk, cheese, sugar, yeast and orange. The remainder of the foods were arranged in a rotary diversified diet, so that no food was eaten more often than once in every five days. Most food sensitivities can be handled by the body provided the foods are not eaten too frequently and in too large quantities. Most of the population would benefit from and enjoy a rotary diet, because of the greater variety of foods eaten and with the reduced possibility of developing food sensitivities. The individual possessing a complex medical problem caused by multiple sensitivities including foods, should remain on a rotary diet indefinitely. This type of diet requires a drastic change in our eating habits and dietary thinking. We also acquire a lot of new knowledge of the biological classification of foods. You will learn that potato, tomato and peppers, celery and carrots, peas, beans, peanuts and soy beans are related members of different families of vegetables. If you are highly sensitive to one or more members of a food family, such as wheat and corn of the grass family, then adverse reactions can be expected if you eat other members of that same family, namely oats, rye, rice, millet, etc.

A rotary diet is composed of 5 separate collections or menus of different food families, one for each of 5 consecutive days. A different protein such as beef, fish, lamb, poultry, rabbit, pork, etc., is selected for each day, along with different families of vegetables, fruits, grains (when allowed), and beverage. No family of food is used 2 days in a row, and the 5 different daily menus should not be changed from one day to another once they have been established. Related foods should be eaten on the same day, such as milk and cheese with beef, eggs with chicken, ham with pork. The foods are arranged according to the foods you like to eat together.

In addition to the inhalant and food sensitivities we found that our young patient also has sensitivities according to her history, and confirmed by our testing, to a large number of environmental exposures. She is sensitive to chlorine and fluorides, so it is necessary for her to use clean spring or well water for drinking and cooking purposes. She must avoid fluoridated toothpaste and use a mixture of sea salt and soda instead. She also reacts to tobacco smoke, perfumes, auto exhaust, sponge rubber, synthetic materials, furnace oil fumes, and food additives. This type of clinical sensitivity complicates the problem very much. Because of these reactions it is essential that she avoid all unnecessary drugs during the pregnancy in particular, and at any time in her life. Fortunately she does not have a sponge rubber mattress, but she will need to change her sponge pillow to Kapok or cotton. The patient must stop smoking immediately, and no one is allowed to smoke in the house. No aerosol sprays or strong smelling cleaning compounds can be used. Perfumes, hair sprays, after-shave lotions and deodorants must be avoided. Because of her sensitivity to food additives, natural or organically grown foods should be used in the rotation diet, and all foods should be cooked at home. All convenience, precooked and prepared foods must be avoided. Usually, good naturally grown foods will supply all necessary vitamins and minerals for the pregnancy. Dietary supplements of calcium, vitamins B & C can be added when necessary. Avoid all food colours, dyes, flavours, junk foods, snacks and pop.

It has been well documented that infants can be sensitized in utero to various foods that the mother eats, particularly if the mother has various cravings during pregnancy, and if she satisfies these with overeating. It is also important to study the behaviour of the child in utero, because fluctuating bursts of hyperactivity may indicate that the child is reacting to some exposure to which the mother is reacting.

If an adverse reaction to anaesthetic or drugs is experienced during or following delivery, the free use of oxygen therapy for up to 1 hour, as necessary, often will control the symptoms. Only the minimum of medication should be used, and only if absolutely necessary. A recent issue of Chatelaine magazine featured a horror story on the adverse effects of chemicals on pregnancy.

The ecologic principles of management of the newborn are similar to those of the parents because of the presence of a constitutional predisposition to develop hypersensitivities, should we be so neglectful as to provide the suitable environmental exposures. Clean water, food and air must be provided for the susceptible infant. Avoid processed commercial foods and use nutritious naturally grown foods. All foods and meals must be processed, stored and prepared at home. The infant's foods can be produced in an edible form by using blenders, juicers, etc. The infant's wardrobe and the internal furnishings of the home should be made of natural fibers, cotton, linen, silk, wool. The best type of heating for the home is electric, solar or a heat pump. This avoids exposure to fossil fuel fumes and their combustion by-products.

The mother, having properly prepared her breasts during the pregnancy, will embark on a long-term breastfeeding programme which should continue for a minimum period of 12 months. No solid foods or dietary supplements should be added to the infant's diet for the first 4 to 5 months if the supply of breast milk is adequate. This allows the infant's digestive tract to mature, so that it can handle the foods with less prospect of adverse reactions.

During the breastfeeding stage of the management, careful observation of the infant may show variations in health or behaviour. Any abnormalities are probably due to food antigens which are transmitted to the infant via the breast milk. The cause can usually be easily detected by studying the mother's rotary diet because the infant's symptoms probably will appear on the same day of rotation. Further proof can be provided by removing the suspected food from the mother's diet and reinserting it on the next rotation. The infant's symptoms should recur with the reintroduction of the suspected food, which is then deleted from the mother's diet for a period of 4 to 6 months, and then tested again. This also proves the point that the mother and infant sensitivities are not necessarily similar.

When the time has arrived to add solid foods and fluids to the diet, this should be done on a 3 to 4 day rotary basis beginning with fruits and vegetables, followed by meats, poultry and finally cereals. Wheat, corn, eggs and citrus fruits are withheld from the infant's diet for the first 12 months. The first cereals to be used are rice, barley and oats. Cane sugar is excluded, and honey and maple syrup may be used sparingly in rotation. The rotation of the infant's diet will quickly identify foods which are not tolerated. These foods can be deleted for a month or two and then added again on a trial basis.

The diagnosis and treatment of specific causes is a much superior approach to the solution of medical problems than it is to treat symptoms. Likewise the prevention of disease is the ultimate in medical management, and I believe that breastfeeding, along with an ecologic approach to the management of our lives, will remarkably reduce the future incidence of disease and chronic ill health, and better equip our future generations to meet life's challenges and solve society's problems.

We have recently been made aware that some present-day diseases have their origins in 10 to 20 years ago environmental exposures. This should give us cause to pause and think about what our actions inadvertently are doing to our future unborn society. We have become the over-medicated synthesized society. In many cases our entire living environment is synthetic in origin; contamination of the air, food and water is progressively increasing, and this constant over-exposure will probably prevent our hypersensitive constitutions from adapting successfully.

We are unable, and have no desire, to turn the clock of "progress" entirely back, but the salvation of the hypersensitive individual is to acquire clean air, clean water and clean food, and return to a more simple way of life with the preparation of one's own foods and meals, so that we can cope with or adapt successfully to the contaminated atmosphere in which we must work and live.

We have an awesome responsibility to our future society and to generations to come, but adequate knowledge and preparation may prevent future development of disease.

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5. ECOLOGIC CONTROL OF CHEMICAL EXPOSURES

It is important to remember that the successful control of your problem will result only from proper management of all the different causes of your illness. These causes basically are sensitivities to inhalant particles such as pollens, dusts, moulds, feathers, animal danders, etc; and food sensitivities, which are managed by means of avoidance of foods which cause symptoms and by rotating the remaining foods so that you do not eat them more often than once every four to five days. But the situation is complicated by the increasingly high concentration of chemicals artificially introduced into our environment. The management of chemical exposures is therefore very important.

The severity of your reactions to various chemical exposures will determine how much and how soon you must do to avoid them at home, at work, and when you are outside the home. First of all, the water that you drink must be clean and free from any additives such as chlorine and fluorides, etc. This means that you must obtain water from a drilled well or a spring which is declared clean by the Department of Health. This clean water is used for cooking and drinking. Also, it is important that you do not use fluoridated toothpaste, but instead, use a mixture of equal parts of untreated sea salt (obtainable from a health food store) and baking soda. The utensils in which you cook your foods should be made of glass, china, stainless steel or cast-iron. Do not use any Teflon treated utensils, or any aluminum ware. In the refrigerator, your food should be stored in glass, steel, or china, but never in soft plastic containers. Similarly, when you prepare your food for freezing and storage, use either cellophane freezing bags, glass jars, or foil. Some of the plastic freezing bags may be suitable if they do not have any odour. Fish can be stored in milk cartons to which spring water has been added. In this way they are frozen in a solid block of ice and retain their moisture and freshness.

The most important room in the house from which all chemical exposures must often be removed is the bedroom, where you spend more hours in a day than in any other part of the house. All synthetic materials must be removed from the bedroom, including sponge rubber, synthetic rugs and plastic, synthetic or fiberglass drapes. Window blinds should be removed. If necessary, hang a cotton bed sheet over the window. All fabrics should be made of linen, cotton, silk or wool. If you are sensitive to the fumes from the furnace, then the hot air vent from the forced air heating system should be completely blocked and sealed off and the bedroom door should always be kept closed. If fresh air is needed, then the bedroom window can be opened. Under no circumstances should an electric blanket be used. Feather pillows may be used on the bed if you are not acutely sensitive to feathers. If a pillow is not essential then sleep without one. Otherwise kapok pillows, and even some quilts or cotton blankets can be placed in a pillow-slip. Certain people can tolerate dacron or other synthetic pillows, but rarely can a sponge rubber pillow be used. A coiled sping mattress should be on the bed, and not sponge rubber. If you live in a very cold climate, then portable electric heaters can be installed in the room, or use a feather comforter on the bed.

Basically speaking, only natural fibres such as leather, linen, silk, cotton, wool should be used for the contents of the house, including curtains, upholstery, floor coverings, etc. If you are acutely sensitive to sponge rubber and synthetic rugs, then these should be removed as soon as possible, and in the meantime just use wooden furniture.

If your house is heated with forced air from a gas or oil furnace, then it is important that an adductor fan be placed in the furnace flue between the barometric damper at the back of the furnace and chimney. This fan should be tied with the thermostat upstairs, so when heat is called for, the fan in the stack will go on at the same time as the furnace, and this will reduce the possibility of furnace fumes entering the basement through the barometric damper. Also, it is possible to have metal charcoal filters made up to put in the furnace, and this will help to filter out any chemical odours that may be present in the household air. It is best to avoid electrostatic air cleaners because they produce Ozone and Nitrogen oxide both of which can cause serious side effects in the chemically susceptible patient.

It is important not to use any sprays or strong smelling cleaning agents inside the house. Pesticides, air fresheners, hair sprays, colognes, perfumes, deodorants, paints, after shave or any fragrant cosmetics should be either thrown away, sealed in an air tight box in the basement, or locked up outside the house.

No one in the household should use cosmetics and tobacco smoking should not be allowed in the house at any time. Avoid the use of floor waxes, bleach, ammonia, or any strong smelling cleaning materials. The best cleansers are ordinary soap flakes (or a non-scented detergent), Arm & Hammer washing soda, or Bon-Ami. Borax can be used as a bleach, and as an insecticide. Avoid kleenex or other facial tissues and use cotton or linen hankies.

If you are only mildly or moderately sensitive to chemicals then you can take more time to remove all synthetics and other chemicals from the house and to make the other necessary changes. If you are exquisitely chemically susceptible, then you must immediately remove or correct all the chemical exposures in the home. The longer you delay in making the changes, the longer you will remain sick. The removal of all sources of chemical exposures should be carried out in any home that has members of the family who are allergic or hypersensitive. The chemical items which need immediate attention are tobacco smoke, perfumes, aerosols, sponge rubber, synthetic rugs, and the heating plant.

Electric, solar or heat pumps are the safest types of heating for the chemically susceptible patient to use and one of these should be installed in any new construction. In forced warm air heated houses, the coal, gas or oil furnaces can be replaced by an electric type, provided the amount of insulation in the walls and ceilings meets with Hydro standards for electric heat.

From a dietary point of view, it is important to eat naturally grown or organic foods which are clean, and free of all pesticides, herbicides, or any other food additives. It is especially important to avoid convenience foods, fruit drinks, or soft drinks, pops of all kinds, food substitutes, etc., all of which contain synthetic colours (or dyes) and flavours, preservatives, synthetic sweeteners and various other food additives, conditioners, etc. etc. The chemically suceptible patient must not purchase or eat food mixtures. Buy plain ingredients to prepare at home. Many dietary supplements such as vitamins, minerals, etc., are of synthetic origin or have different chemicals added to the raw material during the processing and production. All of these should be excluded from your diet and your clinical ecologist will determine whether or not any supplement should be added and at the appropriate time. Most patients do not need dietary supplements provided their diet consists of wholesome, nourishing naturally produced foods which have been grown in healthy well-balanced soil which has not been treated with chemicals of any kind.

No feathered or haired pets are allowed in the allergic household. Cats and dogs may carry various chemicals on their coats in addition to proving a source of exposure to parasites and various diseases.

All plants must be excluded from the house.

Any indoor painting should be carried out during the warm weather when windows and doors can remain open, and if necessary, the occupants can camp outside while the paint fumes dissipate. Portable fans are useful in circulating fresh air through the painted areas of the home. Use paint products which leave little or no residual odour and which will cure quickly. Casein paints are frequently well tolerated by the chemically susceptible patient.

Be certain to test any new fabrics or materials before buying them and bringing them into the house. Obtain a reasonably sized piece of material and place it in a glass sealer without any rubber or plastic material in cap or top. Place the sealer in the sun for several hours or warm in the oven at 200 degrees for an hour or so, then set it aside to cool. When cool, remove the top and smell the contents. If it has a detectable odour, avoid using the material.

If you decide to buy new upholstered furniture, it is probably best to have it custom made so that you can personally select and supervise the material used in its construction. Do not use pine, cedar or spruce wood for the framing, but rather select a wood that does not have an odour. Use plain cotton padding and avoid synthetic materials such as sponge rubber. Select a cotton fabric covering material which after being found to be well tolerated by the glass jar test, should be laundered at home to remove all the size, fixatives, mordants, etc. Then return the fabric to the furniture manufacturer to cover the mattress or furniture

When you decide to buy some new floor coverings avoid all synthetic materials and concentrate on cotton and wool rugs. All domestic and many imported woollen rugs are moth-proofed using pesticides such as Dieldrin, etc. and they should be avoided. Some suitable woollen rugs may be obtained from foreign countries where moth-proofing is not required in the manufacturing process. Another source of safe woollen rugs is at auction sales of quality household furnishings which are older and which predate the moth-proofing era.

Various synthetic objects such as clothing, blankets, etc., can be stored temporarily in closets, dressers, boxes, etc., provided they are not opened.

Eventually, all clothing should consist of non-synthetic materials. Great care should be taken in the purchase of leather coats, jackets, etc., because they may produce noxious odours for an indefinite length of time. Dark coloured clothing is more likely to cause adverse reactions than lighter coloured fabrics.

In the purchase of a car, carefully examine the upholstery for adverse reactions. Some makes of cars have interiors which are better tolerated than other types. If you are considering a long term investment in an automobile, then obtain one that has leather upholstery. Also, your car should have an air conditioner that will allow you to shut off all outside air and recirculate the air in the car. Charcoal aircleaners which plug into the cigar lighter receptacle are available and are valuable for those patients who use their cars a good deal, especially in the cities and are therefore exposed to heavy exposures to traffic fumes.

Charcoal air cleaning equipment is available for the home and small portable handbag masks can be made at home.

You will only succeed in solving your problem by accepting and understanding the fact the individuality of your sensitivities and requirements. Your needs are not the same as those of any other person. You must set up your own programme to manage the chemical exposures which affect you. Do not expect other people to solve your problem for you. They may help you but the degree of successful return to health depends entirely on your own efforts. Also, we receive nothing from this world free-of-charge. There is a price for everything and the price that you have to pay is hard work and DISCIPLINE. However, there is good health and happiness waiting for you at the end of the rough and rocky road. All you have to do is go and get it.

II

THE HUMAN ENVIRONMENT

1. OUTDOOR POLLUTION

Pollution may be defined as being artificially induced deterioration of the natural environment of air, water and soil, with ramifications affecting our health, economic and aesthetic values, and our natural resources.

One of the most urgent challenges facing mankind is the growing deterioration of our environment. The very thin layer of soil, water and air which surrounds our planet and which supports life is called the Biosphere. It is in danger of destruction. The problem now is, how can man control his activities and hence his environment, so that the earth is not rendered uninhabitable. Growing populations and increasing industrialization as well as urbanization, are creating waste disposal problems for society in association with scientific and technologic advances. The Biosphere is a wafer-thin envelope of air, water and soil which surround the earth and which measures approximately 8 miles deep. It measures one thousandth of the planet's diameter and contains all the life systems known to us. Most forms of life exist within the top ½ mile of the seas and the lower 10 miles of the earth's atmosphere.

Very little was done to affect the Biosphere, until the age of modern man, who has measurably affected the flora, the fauna, and even the weather in certain areas of the planet. Vast man-made deserts exist in Asia and Africa. Palestine and Greece were once well clothed with forests. Environmental destruction occurs because other areas of natural resources are available for exploitation. The luxury of inexhaustible raw materials is no longer available because of the greatly increased world population, as well as the enormous and growing powers given to man by advances in science and technology. The progressive increase in air, water and soil pollution is partly due to the number of people living on the earth, which increases by nearly 200,000 every 24 hours. Directly related to this daily increase in the earth's inhabitants is the disposal of the resultant body and industrial wastes without damage to the ecosystem. Another byproduct of the rise in population is the increased use of fossil fuels with consequent daily addition of enormous tonnages of contaminants to the atmosphere. Air pollution is the major byproduct of human dynamics, and may ultimately be the deciding factor in determining man's fate.

Air pollution is of major concern to all of those individuals who suffer from medical complaints caused by susceptibility to any chemical fumes, odours or smokes, but it is also important to our aesthetic and psychological needs as well. Odours from various sources deprive many people of the full enjoyment of their property. Particulates and oxidants diminish visibility, filter out sunshine and cause fog and rain. Highly contaminated atmospheres cause deterioration by oxidation of metal, stone, rubber and plaster. Priceless works of art and antiquities decay from exposure to smokes, fumes and dusts.

Air pollutants offend not only the sense of smell but the sense of sight. Air pollution and offensive odours are considered synonymous by many people, and in some cases have been the basis of favourable Court judgments for the sufferer. The pollutants can cause serious traffic hazards due to reduced visibility. They reduce the amount of sunlight, cause fog and haze, and discolour the beauties of the sky and landscape. In Italy and in Washington, U.S.A. as well as other heavily polluted areas of the world, the acids from smog eat away at the centuries-old sculptures, marble monuments and buildings. Aerosols such as smoke and hydrocarbon mist affect visibility by scattering and absorbing light.

THE ANNUAL BILL IN THE U.S.A. FOR THE DEVASTATING EFFECTS OF AIR POLLUTION IS ESTIMATED AT $9.5 BILLION.

Air pollution has known great antiquity and probably began in the cave of primitive man with his smouldering cooking and heating fire. The Romans complained of soot dirtying the white wool togas of the patricians. In the year 1257 Queen Eleanor of England was unable to remain in Nottingham because of the smoke, and 50 years later a commission was appointed "to enquire of all who burned sea coal in London and parts adjoining". In the 16th century the Europeans were concerned about the ill effects of the smoky fireplaces which were used as a source of heat. In 1661 a tract on air pollution was published in England: "Fumifugium or the Inconvenience of the Aer and Smoake of London dissipated". The industrial Revolution covered buildings, vegetation and humans alike with soot. For centuries man has pumped gases and particulate matter into the atmosphere. Air pollution now afflicts almost every major city in the world, as well as many small ones.

In more recent times many large cities of the world including Tokyo, Los Angeles, London, New York and others have encountered great difficulties with debilitating and deadly smog. Killer fogs have occurred in the Meuse Valley in Belgium in 1930, in Donora, Penna. in 1948, and in London, England in

1952 and 1956. People with chronic chest or heart disease were the most severely affected, and many died as a result. The normal population suffered from eye irritation, coughing, wheezing, chest pain, nausea and vomiting, and the exposure increased their susceptibility to other illnesses later on. These fatal episodes occurred in the presence of a temperature inversion, whereby a higher layer of warm air in the atmosphere traps a lower ground level layer of cold air in which all the air pollutants accumulate to toxic concentrations, and are not allowed to disperse normally. The toxic ingredients are a mixture of automotive, domestic and industrial emissions which include carbon monoxide, carbon dioxide, lead, hydrocarbons, oxides of nitrogen, sulphur oxides, aldehydes, ozone and particulate matter. In 1956 the British Parliament passed the Clean Air Act, barring the use of soft high-sulphur coal in homes and factories, and decreeing the use of hard coal, gas, electricity or oil for heating and manufacturing. Each year, thereafter, the air environment of London became progressively cleaner. Even today, the Tokyo traffic policeman while on duty requires frequent treatments with oxygen to counteract the adverse effects of traffic fumes.

Outdoor pollution includes the contamination of air, soil and water in all respects. In human ecology, the soil and water pollution can be more easily and successfully managed than can air pollution. Spring water, which has not been treated with chlorine or fluoride, and naturally grown foods, are readily available to those individuals who do not possess a drilled well or who do not wish to grown their own foods. It is much more difficult to avoid polluted air because of the necessity to live and work in a fixed area. Some of the more chemically susceptible individuals may find it necessary to move the geographical location of their home and employment to avoid exposure to noxious fumes, smokes, etc., in order to achieve good health.

Pollution of our common foods such as grains, vegetables and fruits usually occurs from chemicals of synthetic origin which are applied during the growth period, from either external or internal sources. A variety of chemical exposures is possible, but the most important ones are pesticides and herbicides. Some of these act on contact with the surface of the plant, and others are absorbed from the leaves or soil and are contained within the plant and its fruit, In order to prevent disease and to shorten the maturation time for animals and poultry, various chemicals including antibiotics, hormones, and urea which is manufactured from natural gas, are added to the dietary intake or given by injection. A very large number of different specific food additives such as preservatives, stabilizers, fungicides, dyes and flavours are added to foods during their manufacture. Chlorine and sodium fluoride are added to certain municipal water supplies in the belief that this will reduce the incidence of dental cavities. The hazards presented to the chemically susceptible individual by exposure to all these chemicals far outweigh any benefit or advantage that may be claimed for them. Naturally grown or organic foods provide a much higher quality of food than those that are grown by means of pesticides, herbicides and synthetic fertilizers, and they have a much more enjoyable flavour.

Man is at the apex of the ecosystem food chain and is the recipient of the accumulated chemical contamination contained in his foods, e.g. D.D.T. is stored in the fat of the lower forms of life which are included in his diet. Sometimes chemicals which contaminate an animal's food are passed on to man in food which is produced by that animal. Some farmers in British Columbia had their milk rejected by the processor or distributor, due to an abnormal concentration of Dieldrin, a pesticide which had been sprayed on potatoes which were fed to the cows. Another example relates to Penicillin sensitive individuals whose health is threatened by drinking milk which comes from cows which have been treated with Penicillin bougies for mastitis.

Downwind contamination of vegetation occurs with spraying techniques, from highway fumes as well as from industrial effluents. A recent investigation of the emission of fluoride waste from a nearby fertilizer plant showed that the fluoride fumes contaminated the vegetation, which when eaten by dairy animals caused constitutional signs and symptoms of bovine fluorosis with the consequent loss of a large number of valuable livestock. The hunting of pheasants and ducks was cancelled in Alberta due to the high mercury content of the meat, which was caused by the birds eating seed grain which had been treated with a mercuric fungicide. A catastrophe due to the same cause occurred recently in Iran when several hundred peasants died from eating seed grain which was similarly treated. There are recorded instances of song birds completely disappearing from towns where the shade trees were sprayed with D.D.T. to control insects carrying disease. Our birds of prey are in danger of disappearing because of the effect that D.D.T. has on their calcium metabolism which results in the production of thin shelled eggs, which either fail to hatch or become destroyed in the nest. These birds acquire the D.D.T. from fish or rodents whose fat contains high concentrations of pesticides.

Contamination of our water supplies occurs from diverse directions. Probably the most important is from the disposal of human and industrial wastes. In recent years, public demand for improved environmental standards has resulted in the formation of provincial and federal ministries of ecologic management. Standards of quality have been established which must be met by industrial and municipal organizations. Secondary and tertiary sewage treatment facilities will replace the discharge of raw or partially treated sewage into our lakes and rivers. Contaminated surface water can further complicate matters by finding its way into underground water courses which supply water to unsuspecting rural households.

Industrial chemicals pour into our waterways. Pesticides, Nitrates and Phosphates wash in from the agricultural communities. Phosphate detergents as well as other chemicals used in domestic cleaning add to contamination of our water supplies. The addition of these chemicals to our lakes and rivers depletes the oxygen available to fish life by encouraging the growth of algae, which has destroyed the ecologic balance of our lakes and thus has destroyed the once prosperous commercial fishing industry. Some American rivers, such as Ohio's Cayahoga River, actually catch fire due to the high concentration of industrial and petroleum waste products which are allowed to contaminate the river.

Some of the largest rivers on the continent carry contaminants to the ocean and destroy the neighbouring fishing resources such as oyster, lobster and clam fishing beds. Oil spillage on the world's oceans amounts to a total of 4 to 10 million tons per year. Severe episodes of acute pollution occur, when oil tankers run ashore during severe storms. In this instance, all surrounding surface sea life of birds and fish is immediately destroyed, and a long-term destruction of the inhabitants of the sea bottom occurs. The plankton in the ocean, which produces three quarters of the earth's atmospheric oxygen, and also serves as a major food supply for man's source of sea food is destroyed. Contamination of many bodies of water by mercury has been a common occurrence in the past. In some instances the results have been tragic, such as in the deaths of a number of Japanese fishermen who died from high mercury content in the fish which formed a major part of their diet. Some of the lakes in Ontario have been closed to fishing for the same reason. Some of the whale and seal which inhabit the Artic Ocean and Hudson's Bay possess mercury levels higher than the amount considered safe for human consumption.

Airborne contamination of our water resources occurs by absorption of various chemicals from the air, and from radio-active fallout which can be monitored in the air around the world for a very long time after an atomic test explosion. Some chemicals such as D.D.T. are insoluble in water, but they can be carried for vast distances around the world in the form of dust, so that, although the use of this pesticide has been largely banned for use in Canada, we can still be exposed to it as a result of the use in other countries of the world such as India, via the stratosphere air currents. For example, the fat of the **Atlantic** penguin and fish is grossly contaminated with D.D.T., and there is no local source for this contamination except the sea.

Automobile emissions are generally considered to be the major contributor of 60-80% of the urban air pollution, depending on the number of automobiles present in the area, e.g. Los Angeles has a very high automobile population. However, the type of major air pollutant will vary according to the type and source of emission. In Toronto, the major pollutant is gaseous in form and derived from a larger concentration of automobiles. In Hamilton, the pollution consists more of particulate matter due to the larger number of industries in the area. The auto exhaust includes carbon monoxide, and carbon dioxide, nitrous oxide, sulphur dioxide, nitrogen dioxide, which badly affects the eyes and nose. Ethylene, other hydrocarbons and nitrogen dioxide unite with sunlight to produce ozone, aldehydes and various other chemicals. Atmospheric catalysts convert sulphur dioxide to sulphuric acid mist, which has a very damaging effect on materials as well as on health.

One of the major sources of outdoor air pollution involves the use of fossil fuels such as coal, gas or oil, and their byproducts. These fuels are used in thermal processes such as heating and power generations. They have a large sulphur content as well as other volatile impurities. Soft or high volatile bituminous coal is often used for industrial purposes.

A variety of contaminants are added to the air by a variety of industries such as primary and secondary metal industries, oil refining, paper mills, rubber factories. Different metal oxides, minerals, organic and inorganic gases including fluorides, smoke, ash, beryllium, cadmium, arsenic, chromium, manganese and an untold number of other pollutants are added to our environment.

The manufacture of metals and phosphate fertilizers produces quantities of hydrogen fluoride which is a very toxic material.

The transportation industry produces contaminants which are largely derived from petroleum, and this includes automobiles, trucks, buses, trains, ships and aircraft. The pollution produced by one jet plane on take-off is equal to that of 6,500 automobiles. Pulp mills, chemical and plastic plants add 200,000 lbs. of mercury waste to our environment every year.

Domestic pollution includes the incineration of garbage and grass, the use of herbicides and pesticides onlawns, shrubs, flowers, etc.! Outdoor barbecues contribute the fumes and smoke from charcoal straters and smoke from cooking meat and burning fat. One must also consider the exposure from gasoline-powered lawnmowers and other garden cultivation equipment. All of these exposures are significantly important to the chemically susceptible person.

The medical aspects of air pollution indicate that it contributes significantly as a cause or aggravating factor in acute respiratory infections, chronic bronchitis, pulmonary emphysema, bronchial asthma and lung cancer. There is a higher incidence of lung cancer in urban communities than there is in rural areas, even when cigarette smoking is taken into account. Lung cancer has been related to the presence of benzopyrene in automobile exhausts, and it is suspected that fluorides may be involved as well. In addition to frank organic disease being produced, many people experience chronic and recurring symptoms such as headaches, nausea, sleepiness, fatigue, irritation of eyes, nose and throat. There is really no more clean air available to us, it is only relatively clean. The exposure of the city dweller to air pollution may affect the amount of anaesthetic necessary for a surgical procedure. The rural citizen who does not have this conditioning exposure has been found to need less anaesthetic than his city cousin.

What are some of the solutions for the problem? Firstly, controls must be placed on the origin of contamination, so that the air may be restored to its normal function of cleansing itself by air movement with dilution, dispersion and destruction of the offending pollutant. Pollutants react with one another in the presence of oxygen to produce less harmful compounds. The reduction in pollution concentration will prevent temperature inversions and consequent disasters. Industries should be located downwind from residential areas.

Encouragement should be given to farmers to adopt natural farming methods without the use of chemical herbicides and pesticides. Careful control of all outdoor spraying procedures should be instituted.

In the event of a temperature inversion during a period of heavy air pollution, the following measures should be carried out by those who are sensitive.

1. Remain indoors and keep all the windows and doors closed.

2. Avoid unnecessary activity and heavy work.

3. Avoid all smoke from tobacco, charred foods and fireplaces, or from any other source.

4. Turn off all gas or oil appliances and use electric varieties for cooking and heating.

5. Avoid all sprays, cosmetics and anything that gives off a strong odour such as paint, varnishes, cleaning agents.

6. Avoid the production of dusts by vacuuming, housecleaning, dusting, or wood-working.

7. Those individuals who are highly chemically susceptible should try to obtain an activated coconut shell charcoal air cleaner. If one is not available, contact your foundation heating chairman, who can advise where to obtain a charcoal furnace filter through which air can be forced with a fan.

8. Oxygen should be available for those who suffer from chronic heart and respiratory conditions. Prescription of antibiotics may be necessary to prevent secondary infection. Consult your doctor.

2. INDOOR POLLUTION

While the deterioration of the natural environment is due to processes beyond our immediate control and subject only to long term political pressure and technological change, an awareness of outdoor pollution is a necessary first step in coping with it. Most of us, nevertheless, spend the bulk of our time indoors, in houses, offices, schools, or factories; in stores; restaurants and theatres; in automobiles; and the indoor environment is often subject to immediate and individual control. We do not always recognize the extent of unnecessary pollution which we tolerate and inflict upon ourselves and our families. Of course, our degree of control will vary, depending upon the environment in question. We are limited to informal pressure and individual selection when it comes to stores or restaurants or theatres - although obvious health hazards, such as tobacco smoke, may be dealt with through municipal by-laws. We usually exercise a greater degree of control in our work places and in the schools our children must attend, Again, of course, it may be possible to change jobs or schools and thereby escape a specific hazard. But we can also bring pressure to bear on unions, associations, and school boards to effect some changes in our work places and schools. Letters to School Trustees, Board of Education Officials, Medical Officer of Health, Members of Parliament, etc., will make known the aspects of our allergy sensitivities. Specific mention of particular products in a letter addressed to the Food and Drug Directorate, Department of National Health and Welfare, Ottawa 3, Ontario, may be helpful. There is a Hazardous Products Act which means a review should be made with respect to the toxic properties of products used in the home and school, etc., especially if a request is made.

But in the final analysis, our house is our haven. And here we rule. If something offends us, we can be rid of it. We need not allow smoking or perfume or plastics or synthetics in our houses unless we wish to. And if our house - or even part of it - is safe, we can sometimes tolerate limited exposures to other environments.

Structural details and building materials are discussed fully in a later section of this book. The following is a generalized list of chemicals known to have harmful effects and these should be avoided. Any known agents should be given special consideration and tested in small quantities. Be especially careful not to use aerosol sprays--the propellant as well as the product could be a chemical irritant.

Cosmetics: even if these are labelled hypo- or non-allergenic, be sure to use unscented products and be aware too that there is no guarantee that a person will not react to such products. They are free of only the most common allergic agents. Vegetable oils can be used on hair and skin when necessary.

Home Furnishings: curtain, drapery and upholstery materials are often synthetic. Cotton and other natural products that have been chemically treated should also be avoided. Floor coverings can also be troublesome because of the use of vinyls, etc.

Heating: electric heating is preferable. Gas and oil both emit fumes and require oxygen to burn. Fireplaces are a source of chemical contact, but if used, wood is the preferable fuel.

Pine: Christmas trees are a known source of pollution. Also pine panels, studs, etc., used in building.

Cedar: cedar-lined drawers, closets, etc., can be troublesome.

Smoke Odours: odours from tobacco smoke are frequently a cause of trouble to many people. The odours of burning fats are also a cause of irritation. A dish of vinegar will help absorb and clean the air of these odours, and an exhaust fan over the stove can also be of great benefit.

Rubber: sponge rubber pillows, rug pads, etc., upholstery, rubber based paints, are the better known source of contact.

Solvents: from glues, paint, newspapers, cleaning fluids, pens (especially ball point and felt-tipped markers). Water colour, odourless marking pens are available.

Plastics: toys, fabrics and textiles, plastic floors, furniture covers, plants and flowers, etc. "Hard" plastics are less offensive.

Pesticides: avoid the use of these, especially indoors, Good quality lighting and sanitary methods are an effective control of insects and rodents.

Kitchen and Laundry Equipment, Etc.: the kitchen gas stove is the most hazardous. Also gas dryers, gas and oil space heaters and furnaces. Slow escape of refrigerant gases from faulty fridges or air conditioning equipment can cause chronic symptoms.

Clothing and Fabrics: those made of synthetics or treated natural fabrics would give off chemical vapours and should not be used.

Outdoor Odours: seeping in from adjacent areas such as garages which are attached to houses, asphalt drives, vents of dryers, neighbouring heating units, tarred roofs, pesticides used outdoors, spraying of nearby golf courses, parks, etc. Fumes from adjacent parking lost, street intersections, incinerator smoke, etc., add to indoor pollution.

Toys: avoid the plastic types and purchase metal or wooden toys. Offensive items, such as crayons, that are used occasionally can be stored in sealed containers. Honey pails are an ideal storage container.

Electrical Equipment and Appliances: avoid heating pads and electric blankets. Check equipment for sealed motors. When possible, have retailers "burn-off" new appliances before bringing them into your home.

Electric Air Cleaners: are available in various sizes for use in the home or automobile. These contain dust filters as well as those such as charcoal that remove chemical fumes and odours.

Housing: if a patient contemplates a change in housing, a thorough study should be made of the type of accommodation, location, construction materials, heating, etc., so that the least offensive from a chemical standpoint is obtained. Prevailing winds and low humidity factor should also be considered.

Shopping: offensive odours of stores can be very troublesome, especially in certain departments such as cosmetics, auto, cleaning supplies, etc., and these should be avoided.

Schools: are an area of much irritating contact for the chemically sensitive teacher or pupil. An effort should be made by the individual involved to inform the school about the problem, and seek the co-operation of Principal and teachers in avoiding irritants.

Household and Cleaning Supplies: this is a great source of chemical emission and must be given careful study. It is suggested that those with an extreme dust sensitivity wear a cotton surgical mask, possibly dampened, when doing work that will make dust. A painter's mask using disposable filters is available from the Canadian Tir Store, and tolerated by some members. A mask is also helpful to some individuals when doing a lot of reading or writing such as cards and letters at Christmas time, and to cut down on the inhaling of chemical irritants while wrapping gifts. A metal storage cabinet is helpful for storing products that are odoriferous.

Paper Products: to avoid irritation from dyes, use white facial, kitchen and bathroom tissues. Avoid abusive use of paper products. The chemically susceptible person should use cotton or linen hankies and avoid Kleenex and other similar products (although Facelle tissues have been found tolerable by some patients).

Cooking Utensils: avoid using aluminum.

Toothpaste: salt and baking soda are a good substitute as a dentifrice. Some people tolerate caroid dental powder very well.

Shoe Polish: olive oil is a substitute -- a neutral colour, and it will not become rancid.

Ironing Pads and Covers: use cotton -- homemade if necessary, to avoid Teflon coated pads.

Chlorine Fumes: from hot water can be a problem. Culligan Water Ltd. offer a service that will remove chlorine from the water. Also sodium thiosulphate can be added to the bath to reduce the chlorine exposure.

Cleaning Products: chlorine bleaches, ammonia and mothballs should not be used. A list of some less objectionable products is as follows:

- Any unscented soap.
- Amway S-A-8 Laundry Powder and L.O.C. Drops are tolerated by many. These do have an odour, but are "free rinsing", and leave no residue which could become offensive.
- Kosher Kitchen Soap is a good all purpose bar soap.
- Castile Soap -- some, but not all, are tolerated. The Kosher variety is usually safe to use.
- Liquid detergent made from coconut oil is available at Dr. MacLennan's office.
- Tri-Sodium Phosphate (T.S.P.) a heavy-duty all purpose cleaner available in hardware stores -- it is very important to USE RUBBER GLOVES as this product can be absorbed through the skin and can be a hazard to those not even chemically allergic.
- Vinegar has many uses in cleaning. Use full strength or diluted in water as a window and glass cleaner. A solution of vinegar and water is useful in the bathroom, especially the shower stall, incutting through a soap

film and leaving a shiny surface. To clean chrome, use full strength on a soft cloth and polish with a dry cloth or paper towel. A mixture of salt and vinegar will clean brass, bronze and copper. A dish of vinegar will absorb and clean the air of smoke odours. White-streaked winter boots can be cleaned with a solution of vinegar and water. Varnished wood can be cleaned with vinegar.

- Bon Ami Cleanser: has no chlorine and is tolerated by many.
- Washing Soda (Sal Soda Concentrated) is useful in laundry as a scouring powder, and three tablespoons placed in drains once or twice a week will keep them clear.
- Baking Soda has many household uses as indicated on the package. It can be used in the bath, as a dentifrice, and as a safe cleaning agent.
- Baking Soda or Salt are useful as stain removers, especially tea or coffee from cups, etc.
- Steel Wool Pot Cleaners of the type available from Fuller Brush are especially useful for cleaning pots and pans, stoves, ovens, broilers, etc.
- Borax has become hard to obtain, but is a natural bleach, mould retardant and deodorant.
- Nylon Net can be used alone or with a scouring cleanser when cleaning bathroom fixtures, floors, etc., because it will not scratch. Do not use hot water as this will accentuate the chemical properties of the nylon net
- Olive Oil can be sprinkled on a lintless cloth for dusting. Also it can be used as a shoe polish.
- Charcoal packets can be used as a room deodorant, or to absorb odours in a closet or refrigerator

III

HOUSING

1. INTRODUCTION

Lowering the total chemical load on an allergically sensitive person can often help to avoid uncomfortable symptoms and ultimately to reduce sensitivity to any or all environmental factors - inhalant, food and chemical. The home environment is particularly critical, because of the length of time spent there. Often adjustments in surroundings and lifestyle at home can compensate for chemical exposures that are unavoidable outside - at work, school, shopping etc.

Although much concern has been focussed in the past on just the building materials, appliances and furnishings in the home, it has become apparent that attention to the lay-out of the home, the ease of cleaning and storage, and the habits of the occupants are equally important in any attempt to reduce the overall indoor air pollution levels. Even beyond this, the amount of exposure to offending chemicals and standard allergens such as dust and moulds will depend on the hundreds of tiny decisions that each of us makes each day within our homes - how we read, where we sit, how we work, and so on.

The person who has just been introduced to the subject of chemical sensitivity often despairs at the work and thought involved in changing their home and lifestyle in order to reduce their pollution intake. The rewards, however, lie in the health benefits they are seeking. As the first steps are undertaken, the result is often sufficient well-being and energy to go the next step, slowly but surely. Some steps can be difficult and expensive, depending on individual sensitivities. The reader will find, however, that there are always some steps that can be taken immediately and without cost. No matter how small each change is, it can be a positive one, and many people have been surprised by the significant health benefits that can accrue from the total of many seemingly insignificant environmental changes.

Above all, we should emphasize that keeping a home chemically safe for a person with environmental sensitivities is an ongoing job. To be successful takes a great deal of thought and effort. Anyone believing that they can achieve a healthy home by following someone else's instructions without thinking is in for a rude awakening. Prepare yourself to begin to take full responsibility for your environment, for investing your own thoughts and ingenuity, and for reaping the rewards in proportion to your own efforts.

Rarely can changes and renovations be made and then the whole subject forgotten, because the introduction of pollutants into a home is a continual process. They do not all come from the building materials and furnishings - they come as well from what we do within our homes and what we bring into them. When environmental factors are involved, the price we must pay for health is thought and effort. Those unwilling to pay this price have a much lower chance of improving their health, no matter what other medical treatments may be employed.

No one is entirely alone in this task, however. Human Ecology Foundation exists to help people, to keep ideas flowing, to get people together. As further experience builds up, altering and controlling our environment for the sake of our health should get easier and easier.

2. SOURCES OF POLLUTION IN THE HOME

First let's get a true picture of what we breathe in our homes. Before we tour an average conventional home, bear in mind that at present, it is virtually impossible to build a house that is totally free of material that smells and which therefore contributes some chemical contribution to your indoor air. The following list of 'what smells' is not an indication that everything must be torn out - as you will see, you would have nothing left.

Modifying an existing home or building a new home involves very careful decisions. You may have to decide which materials you can live with and which you cannot. Some stay, some must go. You may use different techniques to reduce the effects of problem materials - ways of covering or sealing materials, ways of venting away their odours, and so on.

Every person is individual, and must test for themselves as well as they can. Given ten identical houses and ten very unique families, there will be ten different solutions for reducing indoor chemical exposures in the way that will most help each family's health. There are no standard, blanket solutions, so we must start by knowing at least what can be part of the problem.

The following discussion is therefore not intended to make you think that you are having difficulty with all of the items we list. Every person seems to have a different array and degree of chemical sensitivities. We do hope to provide clues as to what items to suspect and test, if you are attempting to track down possible sources of symptoms you may have in your home or office. This section may also help us to understnad why others may have difficulties in our homes despite our best efforts to eliminate indoor pollution sources.

The list seems endless. It is hard to accept that everything we commonly live with can be a potential problem to the sensitive. It is almost as hard to accept as the fact that commonly eaten foods may be the worst offenders. We were not brought up or taught to recognize that virtually everything in our environment mixes a little bit with its surroundings, affecting our air and us.

Those clean, hard-looking painted walls are not inert. At the surface, if we could see molecules, we would see a very active exchange - some of the paint chemicals vapourizing, some of the room air migrating into the paint. The same with other surface. Fabrics gradually break down, shedding tiny particles. The same with human skin. Once we recognize that microscopically, our environment "mingles", it may be easier to understand how a distant object may cause a physical reaction in a sensitive person.

Many of us have been told "the chemical levels are not high enough to affect anyone". This does not appear to be true for that portion of the population that is chemically sensitive. Clinical ecologists have discovered people reacting to minute concentrations of chemical exposures. Smell is often transmitted not by the movement of great high concentrations of gases, but by minute concentrations, on the order of 'traces', and by small numbers of molecules, rather than by 'clouds' of chemical. It is at this level - trace concentrations, that we can barely smell or not even detect by smell, that many chemically sensitive people can be affected. Higher levels can of course be very damaging for such people. To anticipate sources of pollution at the lower, trace levels will require that we be very alert.

For the most part, we deal with tradeoffs. Choosing materials to live with is always a matter of the lesser of evils. We have not discovered any 'perfect' materials. Testing, therefore, is critical. It is difficult to choose compatible surroundings by theory alone - many people have different ways of testing for themselves. For some people, a mere sniff of a material may be enough - giving some kind of immediate and clear reaction right away. For others, close contact for a long period of time is essential. Some tell by touch. Others get a general unpleasant feeling. Some take a sample of material in a bottle, warm it up, and smell the concentrated fumes. Some isolate the material in a room for a while, then go in with it. Some sleep with it. Most people seem to be able to develop some way that is reliable enough that the test can be repeated, even in a blind, or double-blind fashion, with relatively consistent results.

Let's go through the average conventional home from outside to inside, top to bottom, and see what we can find.

Outside

Odours from the outside of the home can get inside. The smell of hot asphalt shingles on a quite summer day may drift in upper windows. Fresh paint on siding and trim or railings may do the same until it is baked in the sun. Strong rez or other sealer finishes on wooden siding and decking may be responsible for some odour inside, and some people's reactions outside near the home. Fresh caulking material used on the outside to seal a crack may be detected on the inside through the crack. Oil spilled near an inlet pipe may linger for weeks. Chimney smoke from the house may be inhaled again under certain wind conditions. Exhaust air from a sewage or septic system may also travel from the vent stack into the house on occasion.

Inbetween

What's hidden in your walls that could get through? Many homes have a tar-covered building board outside the supporting wooden studs, just inside the siding or brick. There is usually insulation in the walls. The fiberglass type has less odour than some, but it may be detectable in concentration. Foamed-in insulation appears to produce a variety of offending gases. Ureaformaldehyde foam insulation will release formaldehyde gas and several other noxious gases over long periods. Styrofoam is also suspect, particularly if it is open to the air, for example, in an unfinished basement. Insulation batts with built-in vapour barrier may have a tar or glue layer. Cellulose insulation may contain old newsprint and a chemical fire retardant. If your home has a vapour barrier, this may be a sheet of plastic with a mild odour.

How would such things affect the inside of the house? Cracks are the main route. A full plaster or plaster-board wall may seal in most of the odours, but there are often cracks at baseboard level, and sometimes holes or pipe chases connecting the walls to an unfinished basement or attic, allowing some odours to circulate back to the living spaces from there. In apartment buildings odours may travel up many floors in these wall and piping spaces.

What about the walls themselves? Every material may be suspect and can be tested if necessary. Modern practice includes installation of wooden panelling with glues rather than nails. Even with nails, both the wooden wall studs and the panelling itself may contribute trace odours to the room air, and affect some people who may be sensitive. Chipboard or particleboard panelling may exude formaldehyde, from the glue used to manufacture the board. Plaster board may have a chemical compound impregnated in the card-board layer to retard the growth of mould. The drywall filler compound (to plaster over the joints between panels) may also have a strong odour.

Paint may seal out some of the chemicals from the wall behind, but paint itself may provide a background odour which is undetectable by smell except when first entering a room or home. Some people can detect outgassing from paint that is years old. Wallpaper and wallpaper glue can be a potential problem as well. Vinylized coverings are particularly odourous.

Mechanical and Electrical Systems

The walls also have other devices inside. Electric wiring can carry an odour, depending on the type. The electrical service entrance can also be a source in itself. Exposed insulation from large single wires inside a circuit breaker box may give a strong odour. Plastic plumbing pipes (used for drain or wate pipes) may individually have little odour. If you have ever had experience with a large pile of them, however, you might conclude that the total odour of plastic pipes in a home is significant. The odour of the solvent glue used to connect these pipes may be quite strong even when it is cured. Piping is often sealed inside the walls.

One of the most common offenders in a home is the heating system. Oil or gas heat may give off leaked exhaust fumes as well as traces of the raw fuel. High temperatures in the heat exchanger in a forced air system may cause additional problems from burnt or vapourized dust particles (including particles from synthetic materials). High temperature electric resistance heating, either baseboard or electric furnace, may give off odours and be a problem to some. Portable baseboard and radiant heaters may also present a problem. Lower temperature heat, provided by a heat pump or hot water system may give less odour, but some people can be sensitive to the odour of warm copper and aluminum tubing in these devices.

Air conditioners are very popular for persons with allergies, but must be selected with great care for the chemically sensitive. They are usually constructed with foam filters and lots of plastic and glue. Some oxides of aluminum may circulate in the room, blown from the surface of the fins on the cooling coils. Sometimes mould may be a problem.

Central air circulation may cause problems for some because of dusts and moulds accumulating in the ducting system, which is largely inaccessible.

Flooring

Practically any type of flooring may be suspect. The underfloor is often plywood and may have an odour. Tile floors may present a problem depending on the glue used to set them and the temperature of the floor (vinyl in the sun, for example may gas off and contaminate a room). 'Cushion' floor may have a thickened or foamed backing with a lingering odour. Ceramic tiles may present little problem, if set in mortar or if the grout between the tiles seals other glues well. Carpet underpadding and carpeting may be a problem for many. Even after removing the carpet, the smell of the underpad may linger, impregnated in the under floor. Sealers and waxes on hardwood and tile floors may also present significant problems to some people.

Windows

Modern practice now includes vinyl tracks for many sliding glass windows. The vinyl heats up in the sun and the odour can permeate a small room very strongly. Weatherstripping and rubber wedges used to glaze the window can cause similar problems. Wooden window frames are usually softwood, treated with preservative, and painted. All these aspects may cause some problems. Metal windows without a thermal break (allowing a direct loss of heat through the frame) may collect condensation in winter, and the moisture lead to mould growth. The same kind of thing may happen in the outside walls, for example, around electrical outlets where insulation may be inadequate.

Appliances

No matter what the problems are from the materials a house is built of, they can always be equalled or bettered by what we put on our homes. Appliances, for example, have a tremendous potential for indoor pollution.

The kitchen range is a big offender. Gas ranges go without saying. (Copies of research on gas are available at H.E.F. Toronto headquarters.) But fewer people suspect the electric range, which can also cause significant problems. An easy test is to turn on the electric oven or stove-top burner for a few minutes, without putting any food on to cook. Odours are produced from the elements themselves, from burned-on foods and grease, from hot plastic oven seals and from hot wire insulation within the stove. Many models now have plastic surfaced control panels which heat up a great deal.

Built-in fume hoods that recirculate air may help to some degree, but thin, single-pass charcoal filters are often totally insufficient to protect the chemically sensitive individual.

Other kitchen appliances, seemingly innocent, can cause problems as well. Electric frying pans, toaster ovens, warming plates, and so on, almost always give off some odour in themselves from plastic parts and hot insulating material. Electric blenders and mixers may give off very strong motor odours, including ozone from sparking. Electric kettles may also present a significant hazard, particularly those that are half-plastic. Not only do gases enter the room air, but trace chemicals are bound to enter the water. Teflon-coated pans may cause similar problems.

There is bound to be a reason why many people do not enjoy housework. Portable vacuum cleaners not only exhaust some of the dust they inhale, but give out significant motor odours as well, that can permeate a room in a matter of seconds. They are often plastic in construction, adding some outgassing due to the heat of the motor. The flexible plastic of the vacuum hose may also present a problem. Electric brooms are similar, and motor odours are easily detected.

Radios are pretty innocent-looking. But wherever there is heat and plastic there is a potential problem. Careful testing may help to select the right radio for the chemically sensitive. The problem may increase with the length of time it is on, as it gets up to temperature. Television sets are far worse as sources of potential hazards. Usually a detectable odour rises from the back of a set once it is up to temperature. The pre-heated variety may cause a continual input of odours from the electronic parts. Electromagnetic radiation from the set may also affect the very sensitive. Some have tested this by blocking such radiation with a metal window screen placed in front of the set.

Lighting

Practically all lighting can be suspect, for very sensitive individuals. The quality of light and the degree of flicker may bother some. But the aspect that is not often recognized is the chemical pollution. As an electrical appliance, lights produce heat. Wherever you have a source of heat you can expect a problem for somebody. Hot plastic electrical sockets, warm rubber or plastic cords, hot light bulbs, burning dust and their own plastic coating, warm synthetic or plastic lampshades, hot lacquered or painted reflectors, all are potential problems. Ballasts in fluorescent lights may occasionally leak hot oil. Plastic diffusers on fluorescent lights do get warm and do gas off.

Furniture

Furnishings are also obvious items to check. Most modern furnishings contain foam padding and have synthetic coverings, often chemically treated to repel water or resist stains. Any fabrics can pick up odours. A well-perfumed guest can turn your living room sofa into a pollution source for a week. You may also notice that varnished or painted surfaces can absorb perfume where people touch them.

The items you take for granted are also often involved. Soft plastic decorative garbage bins may be a problem for the sensitive. Plastic toys may be a hazard for sensitive children. Even hard plastic may give detectable reactions with sufficient exposure.

The inside of dresser and desk drawers may have strong odours, from masonite drawer bottoms, aromatic wood, or absorbed perfumes. Cupboards with recently-painted shelves may impart odours to clothing and other items.

Knick-knacks and wall hangings may be accepted without question, but may in fact turn out to be significant. Framed pictures often have backings which can be detected by the sensitive when approaching closely.

Big items such as pianos may be detectable across the room, depending on their age and history. Testing with key-board cover on and front closed, compared to open, may give clues here. Some sensitive persons can feel reactions building while playing the instrument, as all the dust and odours from inside begin to circulate with the pounding of the hammers.

Curtains are potential hazards particularly because they can get heated in the sun. Synthetic fabrics and fiberglass curtains can gas off significantly when heated. Because of the large surface area, they may give difficulty even at room temperatures, in the same way as syntehetic rugs can.

Even the Nitty-Gritty

It may be one thing for people new to this subject to accept these larger items as potential polluters, but there is another giant step to understand beyond this. Almost any of the smaller, ever-present objects in our homes may present a problem to somebody. Most of them have some odour, though barely perceptible. Most gas off to some extent. We live in a virtual chemical soup.

What can be involved? Look around. Books, magazines, envelopes, even blank paper, plastic items, painted objects, cardboard boxes, waxed paper, coloured packages. Bottles of volatile liquids, rubber gloves, dishracks, drip pans, plastic grocery bags, perfumed toilet paper, soap bathmats, egg cartons, tupperware, records, crayons, pencils, marking pens, plastic brushes, paper towels, kleenex, oven mitts, telephones, phone books, catalogs. Every house is different, but in our society there are hundreds of little things, out in the open, in open shelves, or in cupboards.

Every item of cloth or clothing is a potential polluter, depending on what it is made of and where it has been. Mattresses, mattress covers, blankets, sheet, pillows, pillowcases, towels. Any clothing that has gone out of the house may have odours from other places. Shoes may be impregnated with strong chemical treatments. New leather coats can permeate an entire home very easily. Rubber boots may have a strong odour.

Plants and animals may be a problem for some, but deserve particularly careful tests because of the strong emotional attachment. Certainly there are tradeoffs here, and some people for whom animal exposures are part of the problem, but not the most critical part, have decided that warmth and companionship is more critical to them. Women may also choose to put up with reluctant, tobacco-smoking husbands. They reach limits sometimes, though, and you would be amazed what some people will get rid of to feel better.

Summary and Conclusion

Now relax. We have made our point that modern homes are polluted. Virtually anything can outgas and often the things we take most for granted can be part of a pollution problem that affects our health and that of our family. Careful thinking, observing, and testing is often necessary to pinpoint and solve problems.

But cleaning a house up is not a matter of throwing out every offender - you would have nothing left, not even the outside walls. Rather, it involves understanding which items are worst for your family, which you can affect, and how they can be altered or replaced. You must know your sensitivities if you are to choose wisely, since you cannot change everything. Reducing the chemical load is your goal. The following sections will discuss where to start.

3. PRINCIPLES FOR AVOIDING POLLUTANTS

First let's look at how many different ways there are to reduce your overall chemical load. Faced with something that adds to pollution in your home, you can ask yourself the following questions:

a. Can you move away from it?

b. Can you find a substitute that pollutes less?

c. Can you vent the odours away?

d. Can you clean its odours out of the air?

e. Can you seal it off from yourself?

f. Can you seal yourself off from it?

g. Can you clean or treat it so that it pollutes less?

If a patient that is highly chemically sensitive wishes to avoid chemical exposures in order to regain his health, he may have to make both extensive and expensive changes to his lifestyle and surroundings. Knowing the many alternative ways that it can be done, in advance, may help to fit the solution to the patient and to his budget. The following list represents a number of different categories of actions that can be taken:

A. Separating the patient and the polluter, by moving one or the other

(examples: - removing objects from the home
- moving away from a high pollution district)

B. Substitution of low-pollution surroundings for high-pollution surroundings

(examples: - change heating system from forced air natural gas to electric
- use cotton fabrics instead of polyester)

C. Direction of the output of a polluter away from the patient, without moving the polluter itself

(examples:
- ventilation of a stove to the outside
- drawing the odours of printing materials away from a patient with a fan)

D. Indirect removal of the output of a polluter, without removing the polluter itself

(examples:
- use of an air purifier in the patient's room)

E. Sealing off a polluting object to reduce its output of pollutants

(examples:
- covering plastic material with aluminum foil
- putting all polluting objects in one closed "dirty" room)

F. Sealing off the patient from the polluting object and/or direct treatment of the patient's intake air

(examples:
- putting the patient in one "clean" room with filtered intake
- use of a charcoal mask by the patient
- use of a filtered air intake in a well-sealed car during travel)

Using these principles, applied to the list of potential chemical sources that the physician and patient will have determined together, the patient can gradually introduce changes to his environment and lifestyle. The following habits can be established and applied in many situations:

- staying away from polluting things
- removing polluting things when they come in to the patient's environment
- choosing low odour substitutes for standard products
- venting polluting objects when they must be used
- sealing off polluting objects when they cannot be removed
- removing the pollutant from the air
- using masks and filters if tolerated, to reduce unavoidable exposures

4. STEPS TO FOLLOW IN REDUCING POLLUTION IN THE HOME

There are steps you can take immediately, without cost, and with very little effort, that will lower the pollution levels in your home. The first procedure involves a thorough search of the home for removable objects and materials that may be causing problems. Do not underestimate the value of this procedure. At the same time, a complete survey of other potential problems in and around the home can be made, and discussed with your physician. These will be discussed in turn below. The concluding discussion of this section deals with a typical sequence of steps that a chemically sensitive person may go through - from initial clearing of the home and survey of problems, through to major changes or renovations if these prove necessary. Lowering your pollution intake by lifestyle changes is equally important, and will be discussed in a later section.

a. Cleaning out Pollutants in the Home

For this section, we are grateful to Francis Silver, a professional engineer from West Virginia. Frank is one of a rare breed of persons that have trained themselves as "organoleptics", that is, people who can act as a personal detector of pollutants and potential chemical allergens. For many years now, he has been applying his senses to the detection of indoor air pollution in the homes of people with chemical sensitivities.

Cleaning out pollutants in the home can be your first and easiest defence, when you suspect that someone in your household may be made ill by exposure to chemicals. Most people will be surprised to realize how many irritating substances have been brought into their homes over the years. Francis Silver has developed an organized routine for examining a household and its contents. His approach might help many people to achieve some level of diagnosis and treatment themselves, by experiment, in the period that they are waiting to find medical help and more detailed clinical testing. Once you know chemical sensitivities are present, his technique may provide the first means of meeting the all-too-easy prescription: "avoid chemicals".

(Extracts from) Indoor Air Pollution: Ecological House Call for Detection of Sources

by Francis Silver, P.E., November 1978

Mr. Silver sums up the chemical problem by noting how replacement of relatively non-toxic products with more modern, but more toxic, products has added to the seriousness of indoor air pollution.

He advocates developing a "gas sense" which will help you in detecting contaminants. While he also uses detection instruments when they are available, he notes that these measure only the presence or absence of a substance, or its concentration. No instrument will measure toxicity, and some way is needed of getting an overall impression of the suitability or unsuitability of a building for a particular person. Being able to estimate what contribution each uncovered source may have been making in the overall chemical load on the individual, is also important.

"The portion of the sensorium involved in the gas sense will vary from individual to individual, and may change from time to time for the same individual or with different substances. As most of the current toxic materials are irritants, irritation of skin, eyes, face and lung tissue is often important. Tension in head, substernal, or abdominal or muscular cramps often indicate the presence of toxic gases, both irritating and non-irritating. Cramps in the toes or fingers frequently indicates the presence of pesticides. The quality of thought, emotion, and physical co-ordination in self and others should be monitored as changes in these often reveal the presence of toxicity."

He describes the routine he has found most useful to check out a typical home:

"A. I usually first make a grand tour of the house, removing undesirable loose chemicals in cans, bottles or other packages. This can be done quickly, can make considerable improvement, and can be very educational for the householder if they are taken on the tour and your reasons for what you are doing explained to them. I ask for a box or bushel basket to place what is found in. I go first to the cupboard under the kitchen sink, then basements, attached garages, bathrooms, storage rooms, and bedroom closets. The chemicals found are removed right away and placed outside of the house. Technological knowledge of good and bad practices plus opening a bottle of an unknown product and sniffing usually suffices for this stage of the search.

B. I go over the bedding, trying to remove all polyester mattress pads, sheets, pillow cases, dacron pillows, acrylic, polyester, or other synthetic blankets, or wool that has been mothproofed with a material that outgasses (most woolen blankets except very old ones) or cotton ones that give a bad tactile reaction. New sheets should be laundered before using to remove the sizing. Reading labels can be a great aid in making this investigation quickly.

Old mattresses were nearly all acceptable except those that had been mildewproofed or sanitized. Most new ones contain urethane or rubber foam or polyester batter and are usually unacceptable. I explain that the long time usually spent in bed plus the large exposed surface area and the intimacy makes a good bed extremely important. Aluminum foil can be used diagnostically on top of a mattress to determine if it is outgassing in a way that affects the well-being and soundness of sleep. The foil will usually not last but one to a few days, but if the diagnosis is made, then something else can be worked out. Technological knowledge plus the client's knowledge plus the tactile sensation usually suffices for this stage of the work.

C: Then make a rough sketch of the building, showing furnishings, on which to accumulate the information collected during the next phase of the work. This involves going over the building, room by room, making a tactile evaluation of the degree of outgassing of toxic chemicals from walls, ceilings, floors, and various items of furniture. The comments are then placed right on the drawing. Here again, technological knowledge plus the very important tactile impression plus the client's knowledge are the principal tools for this phase."

Francis Silver's paper also contains a number of additional hints for cleaning out pollutants in the home:

- Be willing to go and look and investigate and try to figure out the problem with your own senses and intellect.

- Be thorough. Do not neglect any part of the house. The crawl space beneath the house or the attic above can all be the source of problems. It is not too much trouble to put on old clothes and crawl around in a crawl space or to take enough out of a closet so that you can see everything. I have often found a crucial box of mothballs in the back corner of a closet where it has been pushed back and forgotten.

- It is not too much trouble to make a sketch of the dwelling to show graphically the condition of furniture, walls, ceiling, and floor. It is not too much trouble to tear apart a bed and read all the labels you can find. It is not too much trouble to remove carpet or cover walls with foil.

- Simplify the chemical environment, then if something does go wrong, it will be much easier to find. Remove as many items as possible that could be outgassing and put them outside.
- Be discerning. Give first importance to health and freedom from outgassing. Do not give other considerations more importance. Break the bondage of esthetics, commercialism, fad, fashion, or "what will the neighbours think?" and only give reasonable importance to economics. It is not good economics or esthetics to build your house in a way that keeps some member of the house sick, miserable, inefficient or unable to work.
- Do it now. If something contributing contamination to the air is discovered, if possible, get it out of the building at once. Items which must be put outside can be put in a breezeway, in a garage detached from the house, in a little outbuilding or metal shed that can be purchased, or can temporarily be protected from the weather by a sheet of plastic.

b. Checklist for Searching out Offending Chemical Exposures

You and your doctors may gain more understanding of your present home and how its air gets polluted by going through the following question list, in detail:

1. Location of a patient's home

   What physical things surround the patient's home? (e.g. factories, other houses, trees, roads, etc.) What things does each give off to the air? Assume that all of the outputs get into the patient's home, and into the patient, at least a little bit.

2. Structure and materials

   What is the patient's home made of? What materials are hidden that you cannot see? (e.g. insulation, glue, plywood, etc.) What comes out of each of these materials? Assume that at least some of what comes out gets into the patient.

3. Electrical and Mechanical Systems

   What is used to heat and cool the home? What allows air in and removes air? What provides light? What brings in water? What takes out waste? What is given off by each of these devices? Assume that at least some of what comes out of them gets into the patient.

4. Appliances, Furnishings and Household Objects

What does the patient surround himself with and use every day? What chemical traces does each object or machine give off? Assume that some of what it gives off gets into the patient.

5. Personal Apparel and Toiletries

What does the patient wear as clothing? Does he use any products on himself? (e.g. soap, toothpaste, perfume, cream, etc.) What does each article or product give off chemically? Assume that some of it gets into the patient. Remember that even odours represent particles entering the patient.

6. Activities

What does the patient do every day and where does he go? What chemical exposure does the activity add to the patient? (e.g. smoking tobacco, or going places where tobacco smoke is present, both add considerable chemical load) How near does the patient get to the things around him that give off the most chemical traces to his environment? (e.g. does he sit all day in a plastic chair, or does he stand in the middle of a classroom?) How much does he use the most polluting objects around him? (e.g. does he work with oily machines or printed paper all day?)

7. Inputs and Outputs

Think of the patient's surroundings as dynamic - with objects coming and going over time. How many new pollutants are introduced every day? (e.g. grocery bags, newspapers, magazines and other mail, new people with new smells, etc.) How many pollutants leave everyday? (e.g. is garbage disposed of, or do things pile up? When an appliance is used, is it left out or put away? How often is clothing changed or hair washed, etc.)

c. List of Steps or Changes in a Patient's Environment

During the diagnosis and initial changes to a patient's environment, the patient may be undergoing changes in his overall health, and may be moving from the chronic to the acute stages of ecological illness. His ability to anticipate chemical exposures may be improving as his understanding of the nature of the world around him adjusts. His ability to distinguish specific chemical sources by their contribution to his symptoms may improve as he takes initial steps to avoid exposures. Decisions to modify the environment around him will be heavily dependent on data about his reactions to it, and the sequence of changes will affect the order in which this data comes. Both the patient and the physician must wade through all the possibilities for modifying his environment and pick those that will best reduce the illness and at the same time best fit the patient's means and inclinations.

Usually any changes will be done in a sequence; they can rarely be done all at once. The following represents a sequence of steps that might as an example be taken by a patient that has been proven to be extremely chemically sensitive. Those less sensitive might not require either the same extent of initial diagnostic procedures, or the same extent of long-term life-style and environmental change. Some with higher stress thresholds may be controlled to their satisfaction with only one type of measure (e.g. change in location or change in heating system) without having to take other measures in addition.

1. Initial diagnosis in chemically clean surroundings
2. Preparation of a single clean room in the patient's home as a "haven"
3. Substitution or removal of offending portable furnishings and objects more generally in the patient's household
4. Changes in lifestyle, habits, use of products and materials, storage of offending materials, reduction in outside exposures
5. Introduction of air purification devices if tolerated

6.a. Major fixed household renovations: changes in heating, ventilation, wall surfaces, floor coverings, storage

b. Relocation to existing conventional housing in new surroundings (combined with use of any or all of measures 2 to 6a in the new location)

c. Relocation and rental or construction of specialized 'ecological' housing in new surroundings (combined with most of the above measures)

A carefully planned sequence may make best use of the patient's resources and the physician's time. For example, relocation and construction of special 'ecological' housing without also adopting measures 2,3, and 4, would rarely be an efficient way of reducing chemical exposures. Measures 3, 4, and 5 might be done most economically with detailed knowledge of the patient's spectrum of sensitivities gathered from steps 1, 2, 3 and 4. Each patient may require measures tailored specially to his needs.

5. MAKING MODIFICATIONS TO AN EXISTING HOME

All the principles that apply to construction of a new 'ecological' home apply to modifications to existing homes. Readers are therefore encouraged to read section 6 which deals with new housing.

In general, a few more precautions must be taken in renovation than in new construction, because your family is usually living in the home at the time of the renovations. Having a place where sensitive family members can go during changes may be important. There will inevitably be exposures to dusts or chemical odours that might best be avoided.

For the chemically sensitive, it may also be important in renovation to consider very carefully why you are changing your home. We have seen more people run into trouble when their over-riding reason for change is to improve the decor. Some people will not give up old standards for decoration, and insist on painting and repainting various areas of their home, even in the winter when the home is more tightly sealed. Further illness is often the result, and it is difficult to see how a well-decorated house can compensate for the pain and discomfort of ecological illness.

This is not to say that is is impossible to create a pleasant-looking home that is at the same time unpolluted inside. Rather, we are recommending that people be cautious, take plenty of time to test their alternatives, and put indoor air quality high on their list when making the final decision.

Although it doesn't sound like a very professional recommendation, we have found that people can do a great deal with makeshift or experimental changes, before actually investing a lot of money in renovation. Rooms can be temporarily cleaned out, heating systems sealed off, wall surfaces covered up relatively cheaply and easily with materials (such as aluminum foil and aluminum tape) that are not expensive and that are readily available. What you learn by the experiment dictate how the permanent change can be made successfully

There are four specific categories of renovation that deserve particular comment in this section. The rest are covered in the principles of design of new homes in the following section.

a. Heating

Perhaps the most common investment in an existing home is a change in the heating system, to avoid problems that occurred with fossil fuel sources such as oil or gas. In general, physicians have recommended that persons removing gas appliances and furnace have all gas pipes removed from the house. Merely turning the system off is not always adequate, due to piping leaks. Oil systems pose a problem because of oil spills impregnated in concrete basement floors. Some people have gone to the extent of chopping out and repouring sections of floor that have been contaminated.

Whether or not you change your heating system is up to you and your physician, and we cannot give any blanket recommendations. Some people have done well by compensating in other ways, e.g. strict diet control, or extensive filtering of the furnace air. Others have only felt well once the system was changed.

Electric heat is the alternative most often used, although some have used hot water heat fuelled by a remote oil or gas burner - outside the home entirely. Electric installations that give low temperatures seem to be tolerated best, for example hot water boiler and radiators or a hot water coil in the central furnace plenum. A heat pump will do the same more efficiently, and also provides air conditioning in the summer. In many climates the heat pump will not provide all the home's requirements at the coldest part of the winter, and as a result manufacturers usually build in electric resistance 'backup' heat. This unit contains elements that get hot enough to 'fry' house dust and may give the chemically sensitive person a problem, though only for a short portion of the year. If a system is needed that avoids even this drawback, a hot water electric boiler can be installed as the backup unit.

b. Replacing Problem Materials

Often people find certain rooms or surfaces in the house that give some of the family members health problems, and they may wish to remove or cover these problem areas. The biggest single hazard is that of replacing the material with something worse. Testing alternatives in advance and making mockups of the new surfaces, are important steps.

Expect some surprises when ripping out old materials - for example, mould in the walls if you are removing some sections. A number of people have found that when carpets are removed the underfloor may have absorbed a great deal of odour from the carpet backing, and may smell worse than the carpet did in the first place! Plan to be able to close off these rooms until either the smell has dissipated or you have sealed off the surface with an air barrier such as aluminum foil and resurfaced the floor with acceptable material.

If you can, arrange family life so that a freshly renovated room or area can be avoided while the new material outgases. Painting a child's room one day while he is away and expecting him to sleep in it the next is not a good idea. Move him into another room until the room is tolerable, even if it takes months.

Principles for testing and selecting replacement materials are discussed in section 6 following.

c. Venting

Few changes in the home can be as rewarding as introducing venting to take away problem odours, for example from the kitchen range or from a television set or stereo. It is difficult to avoid all the conveniences of modern life, yet most appliances give off odours that may affect a chemically sensitive person adversely or contribute to the overall load that is preventing him or her from improving.

The most effective venting is accomplished by adding roof fans on the top of the house, with pipes extending through the roof into the house. Since the fan is drawing from the top, no exhaust air can leak out along the piping, as is common with the small popular range hoods that have the fan immediately above the stovetop. Venting cupboards may help to eliminate odours from books, magazines, clothes, and other stored objects that can not always be eliminated from the home entirely.

Be careful when venting appliances not to draw either more or less air through or around a machine than it was designed to have. A television set enclosed in a see-through cupboard without adequate ventilation may fail from overheating. A set attached directly to a strong fan may accumulate dust inside to the point that individual parts overheat despite the strong air flow. Mild venting slightly above the set with a fume hood may be a reasonable alternative that allows the set to function as it was designed.

d. Storage

Clutter is an ever-present hazard to the chemically sensitive, for several reasons. It makes rooms difficult to clean, and it adds odours to the room. Adding storage cupboards to a home may therefore provide a considerable improvement in air quality, even without removing many objects from the home. If any highly volatile, poisonous, or perfumed products are retained in the home they should be kept in a vented cupboard that has continuous ventilation directly to the outside of the home.

6. DESIGNING A NEW HOME

This section will not be like others you may have seen that prescribe specific designs and materials for an 'ecological' house. The reason is an extremely important one - your sensitivities are very individual, as are your family's lifestyle and all other circumstances, including geographical ties, financial situation, etc. This whole chapter is designed to help get you started, but no single chapter, book, or article can design your house well.

We strongly recommend that you get housing design advice from as many different sources as possible. (See references at the end of this book as a start.) We also strongly recommend that you not believe anything you read or hear about WITHOUT TESTING FOR YOURSELF. Sensitivites vary; conditions vary; and materials vary. We have seen too many instances of people 'following the book' and being unhappy with the result. Many times people have used the same name brand product as someone else has used with success. Either their sensitivities were different or the product had changed, and the result has often been disappointment.

What we will do in this section is discuss some very valid and useful design principles that you and your designer or architect can apply to your particular situation. Even for a small building, expect to put a lot of personal time and research into it. We have seen the best success in cases where people have not been in too much of a rush. If you are planning to build in a month and have not started your ecological design, do not expect to avoid major mistakes. If you would like to build next year, and you are starting now on the research and design, you have a very good chance of designing and building a house that will be compatible with you and your family.

While we will mention some materials, remember that all are suspect until proven safe for your family by testing. The most common excuses for taking someone's advice without testing are that it is too difficult to test, that you can't tell one material from another when you feel ill all the time, that your reactions are too delayed, and so on. Yes, it can be difficult, but it is not impossible, and such excuses really announce that you are not willing or able to put out the ingenuity to find a way to test that will work for you. If you are feeling poorly all the time, make more effort to make your interim surroundings clean enough to have 'clear' times, in which you are well enough to test materials. If you have delayed reactions, it will take time under carefully controlled circumstances to follow your reactions. Find others around who can help confirm the relative safety of various materials for them, to use as a guide but not as a final answer.

Instead of trying to make any book the guiding authority on ecological housing, the Human Ecology Foundation of Canada has started to assemble what we are calling a 'data' bank. In this data bank, which uses computer technology to help organize large quantities of information, we will be storing much more precise lists of building materials along with the experiences that various individuals building clean homes have had with each. We hope in this way to help you gain access to all the experience in building houses, rather than try to convince you that any one way is the answer.

Designing an ecological home is a step-by-step process, involving trial and error, feedback and changes. For example:

1. Read as many references as you can about house design in general, and ecological design in particular. The list of references at the end of the book includes other articles and books describing the different materials that have been used by others. Remember that some of their recommendations will be out of date because materials change. Think about the design principles we discuss in this chapter. Establish contact with the data bank and with as many resource people as you can in order to get the latest thinking on overall design and

safe materials. (Knowledge in this area is being modified and updated constantly.)

2. Generate a basic house design yourself or with an architect, engineer or builder. Think out the principles that follow and try to apply them as well as you can in this first 'draft'. Wherever you run short of 'ecological' ideas, just draw in conventional construction, in order to get something down on paper to analyze.

3. Search out samples of materials available in your local area and test them repeatedly with your family and others until you are satisfied that you understand their relative safety or danger for your family. Where your basic design calls for combinations of materials, make mock-ups of them (e.g. make a piece of wall or floor surface with its final finish, if any).

4. Modify your design to take account of the surprises you found while testing.

5. Get feedback on your design from everyone you can. Don't be offended if they criticize - you want to review every idea that you can get. Modify your design again if good ideas come up.

6. Find a builder (if you are not planning to do the construction yourself.) Get his feed back on the design - even builders unfamiliar with ecological construction may have good ideas on alternative ways of accomplishing what you want. The builder will tell you what is practical to ask of present construction tradesmen and what is not.

7. Proceed, remembering that you alone are ultimately responsible for success or failure. You must know your family's sensitivities and test whenever you can. Continue checking and rechecking during construction. Expect surprises and changes as construction goes along.

8. Enjoy the result and please pass on your experience to the Foundation so that we can in turn pass it on to others.

PRINCIPLES IN ECOLOGICAL DESIGN

There are several general principles which can be proposed as guidelines for others entering the field of environmental control for sensitive individuals. The following are a few which we consider fundamentally important:

* Testing. Whether a material or design will be acceptable for any particular individual can only be confirmed by testing. It can be dangerous and expensive to accept techniques which have worked for others. We have come across numerous situations where people have made changes in their homes because someone else told them it would be acceptable. The ultimate test, after everything is installed and paid for, often proves otherwise.

* Detail. Nature is ruthless where environmental illness is concerned. Changing the patient's environment without careful attention to every detail which might present a hazard can lead to disappointment, and misdiagnosis. If that one detail missed happens to be an "Achilles Heel," the result can be disastrous. Again, there are many examples.

* Flexibility. Changing a patient's environment can be an expensive proposition. Many people have invested large sums only to find that a particular method did not work for them. If the change is permanent enough or expensive enough, the patient is left with no choice but to live with it. However, careful ecological design can allow enough flexibility for economical changes later if problems arise.

Out of the many techniques which have been tested in pioneering ecological designs, we can begin to distill specific design principles which may act as a starting point for others embarking on similar projects. These principles can be grouped into a number of areas:

a. Building materials and separation from them
b. Heating and lighting
c. Air
d. Layout, furnishing and lifestyle

Additional areas such as the electromagnetic environment are presently being researched by others, and we look forward to seeing principles established in this and many other areas in the future.

a. Building Materials and Separation from Them

Ecological design focussed initially on building materials and heating systems. Gradually we are finding that all the areas outlined above can be critical. Which area would deserve the most effort and investment in any particular case is a difficult question that can best be tackled by both patient and physician after an accurate diagnosis is made.

The main principles in this area are as follows:

i) Potential Pollutants. Every material in the home is a potential pollutant, and meticulous design could be necessary to prevent each and every material from presenting a hazard to the occupants.

ii) Low Odour Substitutes. It is generally easier to avoid a source of pollution entirely than to try to protect against it when it is already present. Providing low odour substitutes for conventional high-odour building materials wherever this is economically feasible, can help to reduce pollution in the home.

iii) Greatest Exposure to Compatible Materials. It is critical that the building components that the occupants will be most exposed to be the most compatible with the occupants.

iv) Separation From Incompatible Materials. Separating the occupants from incompatible materials in the home can reduce their potential chemical load. It is generally not possible or economically feasible at present to avoid using some incompatible materials.

v) Odour Paths. Odours can be expected to travel wherever there is a path for air to travel. They can also pass through some materials, and can impregnate materials. Hiding a pollutant from view does not necessarily protect an occupant from it. Careful attention to these paths and efficient methods of sealing can be effective in reducing pollution.

b. Heating and Lighting

Heating systems are common offenders, for many reasons:

* high temperatures, causing the burning of dust and vapourization of airborne particles of synthetic materials, as well as causing greater volatility of any plastic parts, and painted surfaces

- contamination of indoor air with leakage from the exhause in fuel-burning systems
- contamination of outdoor air with exhaust gases which then re-enter the home
- contamination of indoor air from leakage of fuel prior to burning
- accumulation and recirculation of inhalant contaminants in air ducts, such as house dusts and moulds

These give rise to a number of principles that can be used in the design of a clean heating system:

i. Low Temperatures. Providing a heat transfer to the occupants with as low a temperature as possible, particularly at the heat source, can often help to reduce potential indoor pollution. Hot water heat is an effective method of guaranteeing moderate temperatures.

ii. Good Insulation of the Home. In principle, a well-insulated home will require less heat and any problems associated with heating can be minimized. Choose insulation carefully. Some types, such as urea-formaldehyde foam have proven to be disastrous for chemically sensitive patients.

iii. Avoidance of Fuel and Exhaust Contamination. Some heating systems will pollute the inside air with either odours of exhaust or of fuel. Electric or solar heat provide excellent alternatives to oil, gas, or wood. Careful separation of the burner components of a heating system may be a more economical, yet less effective solution.

iv. Means of Avoiding Accumulation of Inhalants. A heating system which has all components accessible for regular cleaning may help to avoid the buildup of dust, grease, or other contaminants which could affect the occupants. Systems which do not involve central air circulation may be helpful for some people.

Lighting is another area requiring further development. The character of the electromagnetic spectrum produced by lights in the home is being researched by others and will not be discussed here. This is an evolving field, however, and it will be important not to discount its significance.

Insofar as chemical contamination is concerned, lighting has in our opinion not received sufficient attention. The following are examples of ways in which lighting in the home can contribute to indoor air pollution which may adversely affect the occupants:

- burning of dust on incandescent light bulbs
- vapourization of plastic coatings on some incandescent light bulbs
- vapourization or burning of lacquer and paint on metal lamp reflectors and adjacent walls or ceilings
- vapourization of synthetic materials popularly used in lampshades
- heating of plastic bulb sockets causing chemical odours
- leaking of odours from fluorescent ballasts
- warming and vapourization of plastic diffusers and gratings, particularly in fluorescent lights and special reading lamps
- warming of decorative coverings such as plastic sheaths around candle bulbs in chandelier fixtures
- warming of lamp cords, leading to odours from the cord and plug materials
- accumulation and redistribution of dust, particularly on complex fixtures such as chandeliers
- introduction of odours from paints, oils, sealers and waxes on decorative table lamp bases
- introduction of various plastic and rubber odours through the need for electrical components such as plugs, receptacles, and switches
- in the case of sunlight, warming of window weather-stripping and indoor paints, finishes, and synthetic materials, giving rise to more contamination of the indoor air

A few principles can then be formulated which may guide the choice of lighting for environmentally sensitive individuals:

i) Separation From The Occupants. A clean lighting system will provide light to the occupant without exposing him to undue amounts of chemical odours and dust. Separating the occupant from any pollution which may be caused by a lighting fixture can be effective. For example, fixtures embedded in and vented into a ceiling space might satisfy this principle. A high-wattage chandelier hanging low over a dining room table would not.

ii) Compatible Components. Particularly where it is not possible to separate a lighting source totally from the occupants, ensuring that the materials it is made of or which it affects do not give off significant odours when heated, will help to reduce pollution in the home.

iii) Low Temperatures. As with heating systems, the lower temperature of the light source, the less problem there may be with chemical contamination. Fluorescent light may provide a partial answer, but we would caution the reader to keep up with research on the effects of the fluorescent light itself.

c. Air

Our focus has been on air pollution in the home.. The source and treatment of air can be especially important for an ecologically sensitive individual. Several principles can also be outlined in this area:

i) Location. Locating the ecological home in an area which has generally good air quality is often essential. We are finding, however, that this is becoming increasingly difficult. Area pollution, or contamination of a whole region by pollution from a source often hundreds of miles away, is becoming more common, particularly in North America.

ii) Airtight Construction and Deliberate Venting. Control of air entering and leaving the home may be a key to ecologically sound construction. Many older homes have a great deal of air leakage, through walls and around windows. This leaves the occupants at the mercy of outdoor air pollution.

Airtight construction makes possible the deliberate control of intake air. By itself, however, we should caution, that airtight construction can lead to greater problems if inadequate air changes are allowed and if the building contains many sources of indoor air pollution.

Intake air can be introduced when and where the occupants need it, and it can be treated by particulate or gaseous filtration, heating, cooling, humidification or dehumidification. Special air intake vents, combined with measures to reduce general infiltration, would be an example of this principle.

A second major advantage of airtight construction is that it may reduce heating requirements and any pollution that may arise from the heating system. Economy of operation of the heating system may also help the occupants to afford other special ecological features.

iii) Care to Avoid Pollution of Intake Air. A careful ecological design can also take into account the potential of polluting intake air with odours from the building components or from exhaust air. For example, a hot asphalt shingle roof on a calm day can lead to considerable contamination of the air entering the home, affecting the occupants. Similarly, a badly placed exhaust vent for a central vacuum or kitchen stove can cause the recycling of pollutants back into the home.

iv) Care to Avoid Local Pollution Sources Outside.

It is almost as easy to render an outdoor area unacceptable as it is inside. Indiscriminate use of paints, garden chemicals, softwood, and wood sealers can affect the enjoyment of the outdoors for sensitive individuals. Careful ecological design and scrupulous control of the construction site can take this into account.

v) Purification to Pick Up Residual Pollution. Where it is not possible to reduce pollution at the source, air purification is often the only defense left. Care must be taken, however, since many individuals can become sensitive to purification media. It is an expensive substitute for addressing the problem at the source, but it can be an effective supplement which will clean out residual pollutants.

d. Layout, Furnishings and Lifestyle

Not enough can be said about the importance of the day-to-day patterns, habits, material possessions, and general lifestyle of the environmentally sensitive family. A home designed to provide the cleanest construction possible can nonetheless be rendered exceptionally hazardous to susceptible individuals by the introduction of contaminants in the form of furnishings, possessions, clothing, perfumes, and tobacco smoke. These represent most of the portable items in our lives. Because of their significance in generating harmful indoor air pollution, much can be done by a family to improve its situation without major investments in construction. Conversely, major investments in construction or alterations are not economical if a family is unwilling to control their day-to-day habits as well.

The layout of a house, the furnishings, the acquisition, use and storage of possessions and materials, and the lifestyle of a family can all be altered or controlled to the advantage of sensitive individuals. This area is as extensive as it is significant, and we would like to encourage more thinking in this field. A number of principles can be distilled from the many different ways people have found of altering these factors:

i) Separation of Areas. Homes which allow the air of one area to be separated from that of another will provide more potential refuges from contamination for the sensitive individual. It is almost impossible to keep all pollutants out of the home, and sound ecological design can include provision for defenses against the occasional disaster.

Buildings can be so easily and permanently contaminated by inconsiderate individuals or by accident, that a sensitive person risks having his entire home rendered unsafe.

Most families include a range of sensitivities, or at minimum a range of concerns about adequately controlling sensitivities. Each individual will therefore have a different standard insofar as causing pollution for others is concerned. Careful ecological design can allow for protection of one family member against the ignorance or lack of consideration of another. Where financial problems do not allow the elimination of all significant pollution sources in the home, sealing off one area from another can also provide an economical yet very effective solution.

ii) Bedroom Sanctuary. An extension of the first principle is that at least one room can be reserved for each sensitive individual, that can be kept at the highest standards--dust-free, clutter-free, and chemically-free. This allows a sanctuary to which the individual can retreat in the event of pollution problems elsewhere in or around the home. Making the bedroom the sanctuary is particularly therapeutic since it guarantees many hours in the cleanest possible environment.

iii) Low Odour Alternatives. As with the building materials themselves, wherever it is feasible, substitute furnishings, appliances, and clothes can be introduced as a means of avoiding offending components.

iv) Separation From Polluting Possessions. Where it is not possible or financially feasible to replace possessions to which individuals are sensitive, separation from them is again possible, and many methods can be used. The generous use of cupboards, even vented ones, can help make it easier to avoid cluttering a home with potential problems, Venting of appliances such as kitchen stoves, blenders, irons, and sewing machines may be the only way of allowing some particularly sensitive individuals to continue to get any benefit from these machines.

v) Easy Upkeep. Of paramount importance to many sensitive individuals is designing the home in such a way that it will be easy to keep clean, clutter-free, and dust-free. Again, a place to put objects away, close to the area in which they will be used, will help.

Careful design can also recognize that the process of cleaning up may affect particularly sensitive individuals. For example, some protection can be allowed from stirred-up dust and motor exhaust odours associated with portable vacuum cleaners. Providing conditions which are highly conducive to keeping a clean, organized household may be a valuable component of an ecological design.

Attention to detail can also avoid features that allow into the home materials or equipment that may carry odours to the occupant, but which can't be cleaned either easily or in some cases, at all. An example would be the heat exchanger fins on a hot water coil imbedded in a hot air furnace plenum. Careful selection of decorations and furnishings can also take this principle into account.

vi) House Rules. Another important principle that can be put into effect easily is that a person has the right to lay down certain ground rules for the behaviour of others in his or her home. No smoking can be a critical one. It can be dangerous for the occupant to underestimate how easy it is for a visitor to render his home totally unacceptable environmentally, in the space of a very few minutes. Tobacco smoke and many perfumes are so pervasive that residues can remain for long periods of time.

A PRIMER ON MATERIALS FOR AN ECOLOGICAL HOME

Although we have resisted the temptation to prescribe specific materials rather than have readers test for themselves, it is appropriate here to give some general guidelines on materials as a starting point.

The basic structural materials of a good ecological home can vary from conventional construction to special concrete or block construction with many variations from standard construction. Some people are made ill from the odours of softwood, and some people have excluded softwood framing in favour of masonry framing on the outside and metal studding on the inside. It is not always necessary to avoid every problem material, although it is wise to avoid those that give the worst reactions. Softwood studs, for example, may be acceptable to your family if you design an effective vapour barrier on the outside walls to exclude odours from both studs and insulation. Well-sealed plaster walls and ceilings and attention to sealing cracks at baseboard level may also help to 'close in' problem materials, particularly insulation.

Some people tolerate cement and concrete well, but the more simple the mix - plain portland cement, sand and water - the more likely it is to be tolerable. Mortar cement has more additives and a stronger odour. You may not need to find an alternative to this for brick on the outside, but you might not want to use it as an inside surface, for example. Some insulation materials that would be intolerable when exposed may prove acceptable in other situations, e.g. Plaster of Paris and water, seem to be more tolerable than fancier mixes with additives.

Many people have recommended terrazo and ceramic tile floors as being the cleanest available. This may be true as long as no sealer is applied. Some people have survived the various synthetic floor coverings, either in tile or sheet form. These change often enough that shopping around is the only way to tell. If you have trouble in the store, you may have trouble in your kitchen! Hardwood is tolerated by some, though different people seem to react to different hardwoods. Some are experimenting with unfinished hardwood, while others have used a sealer, with varying degrees of success. Urethane sealers have in general been a disappointment.

Avoiding synthetic wall materials (e.g. vinyl) and furnishings (e.g. foam rubber-like materials and synthetic upholstery and drapes) is a good starting assumption. Finding or designing clean alternatives may not be easy, but it is not impossible. Cushions that can be cleaned are often preferred to fixed upholstery that can pick up perfumes and hold them for long periods.

The design of appliances also change over time, and making your own survey will be valuable. Some have had success with ceramic-cooktop electric ranges, while others are frustrated at their draw-backs (slow cooking). No matter what appliances are chosen, good venting is the key to success, even on unsuspected items like radio and television sets.

Kitchen cabinets that do not outgas are not easy to find. Exposed chipboard and plywood exude formaldehyde and can be an extreme hazard to those that are highly chemically sensitive. Some have had success with metal cupboards. Others have had hardwood cupboards designed.

More generally, if you look for materials similar to: hardwoods, metals, ceramics, concretes, plasters, glass, and baked enamel surfaces, you are probably looking in the right direction. People who are chemically sensitive may in general try to avoid materials similar to: plastics, particularly soft plastics, glues and adhesives, composition boards such as plywood and chipboard, paints, sealers, materials containing insecticides, fungicides, and perfumes, synthetic fabrics, plastic foam-type products, either rigid like insulator or flexible like furniture padding, synthetic carpeting and rubber padding materials.

For heating systems, low-temperature electric or solar heat seems to provide the least problems (e.g. hot water boiler, heat pump). Some people have successfully used fossil fuel heating when the burner is remote from the home or well sealed off from the house (circulating heat through water systems, and enclosing the furnace in a special room vented to the outside). Where possible, find someone who has each different system you are considering, and test their installation.

7. LIFESTYLE - AN IMPORTANT FACTOR WHEREVER YOU ARE

There is another area that deserves some attention along with the rest, that can in many cases reduce the total chemical load on a patient by very significant amounts. It is the area of lifestyle - how we perform our daily activities, no matter what surroundings we are in. Often there are many choices open to us in how we go about these daily activities. The amount of chemical pollution varies widely from choice to choice.

The simple act of reading a book or newspaper is one example. We have a wide range of choices available to us. If I have special equipment, such as a reading box, I can read a newspaper in a way that separates me from the odours of the print and paper. But very few patients actually have reading boxes. The patient without the reading box has a choice. He can stand or lean over the newspaper with **his** head close to the surface. He can sit erect, head back from the surface. He can read in a badly-ventilated room, or he can read with the window open, or outside. He can read it fresh, or after someone else has read it. He can also consider getting his news some other way, by radio or televison, for example.

The example is a simple one, but it demonstrates an important point. Any single activity can be accomplished in a dozen different ways. Often no two ways are identical in the amount of chemical exposure they subject the patient to. Making choices on the basis of exposure could be an effective way of reducing the total load on our bodies. The choices range from changes in our patterns that can be made with no cost, to changes that can only be made with some investment in various articles or inventions, for example, a venting system or a reading box in the case of the newspaper.

Because there are many options available, there are often actions that can be taken immediately, without cost, and without any changes to the physical surroundings. In some cases specific sensitivities, for example, to natural gas, are so exquisite that there really is no choice. Some patients must change the heating systems in their houses, or move, without hesitation, or they will continue to deteriorate. Others with a wider array of less major sensitivities may have the time to experiment with lifestyle options before actually making decisions involving a great deal of investment.

Not only is the concept of lifestyle important when acquainting the new patient with the treatment of chemical sensitivity, it is important for the veteran patient who may have invested a great deal of time, effort and money in getting surroundings for himself that are less contaminated than his original house and place of work. Here again there are always day-to-day choices. They do not stop with the building of an ecological house, they continue forever. The veteran patient still has the choice of walking upwind of the car in the driveway rather than downwind where the exhaust plume is, of reading newspapers in badly-ventilated places or well-ventilated places, or not at all, and so on. There is so much potential for pollution in modern every-day activities, that is, in our modern lifestyle, that even if you have a building made of glass or porcelain, you can pollute yourself just as much in it as in any other building, if your lifestyle does not take into account low-pollution choices for activities.

Dr. Ross Hume Hall, noted Canadian biochemist and author of "Food for Nought: The Decline in Nutrition", has introduced a useful concept in the field of nutrition. He describes four levels of eating, from the most desirable, level 1, to the least, level 4. Level 1 contains whole natural foods, in their freshest, least processed form. Level 4 contains highly processed foods, junk and so-called artificial foods.

The concept is useful because the arbitrary divisions of foods into the four levels allows the patient a simple tool for evaluating his nutrition. Most patients start out on level four, where the majority of North Americans eat much of the time. Since the system allows four levels, the patient can see what he would have to do to improve his nutrition, short of eating perfectly. He can see what to do to go from Level 4 to Level 3. Once at Level 3, he can assess how to get to level 2. If anything on level 1 is easy to get (e.g. raw carrots or other vegetable), he can jump immediately. If it is not easy (e.g. organically raised meat), he can get some satisfaction and possibly improvement in the interim by moving up at least one whole level.

The concept can also be applied to chemical exposures, to buildings, to activities or lifestyle. Reading a newspaper in a level 1 manner would entail the least possible contamination, (for example, reading it in a vented reading box). Reading it in a level 4 manner would entail the most possible contamination, (for example, reading it in a poorly ventilated room with your nose buried in the middle.) A house with every detail designed with ecology in mind might be a level 1 house. What we all live in before we make changes could have been a level 4, (for example, something with new synthetic rugs, a leaky gas furnace, and a mouldy basement). A chemically sensitive patient may shoot for a level 1 lifestyle (least possible contamination) rather than a level 4 (most possible contamination). We all end up achieving somewhere in the middle.

Using the tool, a patient may understand that it may make no sense to spend many thousands of dollars on a Level 1 building if his family wish to live in it in a Level 4 manner (for example, by continuing to smoke.) Filling a cleanly built house with volatile materials and junk that collects dust will not provide the patient with the level 1 level of exposure that he is looking for. If the overall exposures are to be kept low, more than a few small aspects of surroundings and lifestyle must be looked at.

Conversely, a patient may be able to make the best of a level 3 or 4 house by working hard to achieve a Level 1 or 2 lifestyle within that house, eating at Level 1 or 2, etc. A patient may attempt to sleep at Level 1 in order to be able to work during the day at a level 4 job that he cannot immediately leave. Ecological management works on the principle that avoidance of chemical exposures will improve a patient's tolerance for chemical exposures, and many people have been able to cope with some exposures they can't avoid by compensating when they do have control of their surrounding and lifestyle.

IV

FOODS

1. ORGANIC FOODS

Organic foods are grown by means of following the principles of organic gardening or farming. This means that clean foods are produced without the use of any chemical additives in the form of fertilizers, pesticides, herbicides, etc. In days gone by, most foods were grown on the farm or in the family garden plot using barnyard manure as the source of fertilizer, and no herbicides were used whatever. The control of insect pests was by means of other insect predators, certain birds which feed on insects, and certain solutions and sprays of a non-chemical nature. Of course, organic pesticides such as Rotenone, Pyrethrum and other plant by-products were used occasionally. Many gardeners find that fertile soil will produce plants which are insect and disease resistant. Composting is an essential part of organic gardening and farming.

More recently, and since World War II, various chemicals have been developed to increase productivity of the soil. These include fertilizers, pesticides and herbicides. Most of these chemicals are derived from the fossil fuels, namely oil, gas and coal. Originally, after the war, the occupation forces in refugee camps which were set up in the defeated nations such as Italy, Germany, Japan, etc., found that certain synthetic pesticides such as D.D.T. were excellent in controlling disease-carrying pests such as lice, mosquitoes and flies. From this beginning the use of pesticides extended to gardening and farming so that at the present time their use is widespread in the production of foodstuffs for our consumption. In order that broiler chickens may be grown by the thousands in one building, it is necessary to use a variety of synthetic medications to control the spread of disease in these flocks. In the case of beef and pork farming, it is found expedient to use antibiotics, growth hormones, urea, vitamins, etc., which are all of synthetic origin and are used to promote rapid growth and maturation of the animal, and to prevent disease. These chemicals are very often stored in the fat of the animal and, in fact, high concentrations of pesticides have been the cause of death in certain species of birds. You are probably aware of the fact that certain game birds, such as the falcons and the eagles, are in danger of extinction because of the effect of pesticides which are found in their food supply, namely fish and small animals, and which has an adverse effect on their health and reproduction. The distribution of pesticides is worldwide, because studies have shown that the body of the Antarctic penguin has a high concentration of D.D.T. which is derived from the bird's food supply.

The chemically susceptible individual is a likely candidate to react to these various synthetic chemicals and therefore should not eat the common commercially grown foods, but should use organically grown foods. You will all remember that the allergic individual possesses the ability to develop new sensitivities, depending on the degree of sensitivity present and the concentration and duration of exposure. Usually, allergic disease is caused by over-exposure to various incitants which may be inhalant, ingestant or contactant in nature. It therefore is advisable to avoid unnecessary exposures to potential sensitizing chemicals wherever possible. Spring water should be used for drinking and in the preparation of food, and chlorinated or fluoridated water supplies should be avoided.

It is usually agreed that organically grown foods are much superior in quality to the commercially grown varieties. It is difficult to understand why individuals would knowingly eat food which contains potential poisons and which is really second-rate in quality.

While it is desirable to grow your own supply of fruits and vegetable, not everyone is in a position to do so. Fortunately, organic gardening is no longer on the fringes of respectability and it is possible to find organic produce in most areas. Local branches of the Human Ecology Foundation can usually provide important information concerning sources of organically grown food.

2. NUTRITION AND THE ROTARY DIVERSIFIED DIET

A very large percentage of patients who have chronic symptoms suffer from food sensitivities, and in order to clear up these symptoms certain dietary changes have to be made. You avoid the foods that cause strong reactions on testing, and you rotate the remainder of the foods in the diet so that they are not eaten more often than once every four to five days. The food sensitivities are caused by our eating certain common foods too frequently, that is to say several times a day, and in too large quantities. The strongly reacting foods must be excluded completely from the diet for a minimum period of four to six months. This allows your body to build up a resistance to them, so that at the end of that time you may be able to reintroduce them to your diet on a rotation basis. During this period of avoidance, not even a little bit of the food can be eaten. By taking a food once every four to five days, no food is overstressed, and the chance of spreading your sensitivity is much less.

Setting up and managing a rotary diet is a real challenge, but it is not impossible provided you sit down with a pencil and paper, and make out your menu. You have five different collections of foods according to families, one for each day of the five day rotation diet. In order to make the rotary diet work, you must not only have your menu all drawn up in advance, but you must also have the foods in the house ready for preparation for each day. You will be unable to follow the diet properly if you do not stock up with the necessary foods well in advance.

Once you know what foods are allowed in your diet, the different food families can be arranged in any combination which suits the family household's tastes and preferences, and provided they are not eaten more often than once every five days. It is not wise to eat one member of a family, such as potatoes, several times a day. It is better to vary the diet so that you eat different members of the same family on the same day. Once you have decided on the different food families which you want to eat together on each day, do not change this combination. When you have gone through the different successive five days of the diet, on the sixth day you start all over again by eating the foods chosen for the first day, and so one, as you did on the first rotation.

An important part of the ecologic management of your problem will be to avoid all forms of chemical contamination of the foods. That is, you should not use any prepared foods from the store in order to avoid food additives, preservatives, etc. Food mixtures, canned foods, etc., are not permitted in the diet. It will be necessary for you to go back to the old methods of preparing foods from the simple elementary ingredients of meat and vegetables, etc. You may combine them together in your own kitchen, because you know the ingredients that will go into the preparation. If you do not know the ingredients of any food mixture, do not eat it. Only fresh or frozen foods should be used. However, in certain cases foods that are canned in glass, without any sweetening agents, may be allowed in specific cases. If testing indicates that you are sensitive to various chemicals then you must obtain one or two freezers in your home, so that you can prepare a year's supply of various food products such as fruits, vegetables, meats, etc., when they come in season. These foods are prepared in your own kitchen and stored in the freezer in either cellophane bags or glass containers. Sometimes empty waxed milk carton are allowed, but only on the advice of the doctor.

Foods

For a balanced diet you require a wide variety of foods including protein, fruits, vegetable, starches, grains, fats and oils, sweetening agents (if allowed), and beverages. Generally speaking, it is wise not to use any concentrated sweets such as sugar, honey, maple syrup, unless it is specifically allowed for your own individual rotary diet. If you are strongly reactive to one or two members of a family, then you must be very cautious regarding the use of other members of that same family, and the other members should not be eaten on successive days, but there should be two days between the consumption of separate members of that family. For example, if you are strongly sensitive to corn and wheat, then the other members of the grass family, namely oats, rye, rice, millet, etc., should only be eaten every third or fourth day, and great care should be taken to observe for any reactions following the consumption of these foods. The same applies to any other food group. If you are strongly sensitive to milk, then probably cheese will be excluded from your diet, and you must be very careful to observe the effects of eating beef on rotation.

If you are suspicious of any particular food, it is very convenient to test that food when it comes up on the day of rotation. Three or four hours after you have had breakfast, you make a meal of the food you want to test. Only a single food is eaten, and nothing else is consumed at this time. If you have a reaction this food is suspect. No other foods are eaten during the rest of the afternoon, so that you can observe any delayed reactions to the food eaten. When oral feedings of individual foods are carried out in this manner, it is important to do the testing while you are sitting down, not doing anything, or watching anything that will cause a variation in your pulse. Before preparing the food you eat at noon, you should sit down for five or ten minutes, and take a resting baseline pulse. After the food is eaten, pulse readings are taken at 20, 40, 60 and 90 minute intervals. After the 90 minute pulse reading is taken, that is, an hour and a half after eating the food, you may get up and walk around and do whatever you want to, but be sure to watch for any delayed reactions. If you react positively to a food tested in this manner, then it should be excluded from the diet for four to six months, and then re-tested in a similar way at that time. If it is negative on testing, after being excluded from the diet for this period of time, it can be used safely in rotation.

It is best to begin the rotation with the evening meal. In some cases, some food from the evening meal can be used for breakfast the following day. Keep your diet simple and uncomplicated by using a small number of foods. In many cases, eating two reasonably large meals a day, morning and night, are better than trying to find enough variety of foods to have lunch as well. If desired, some nuts and fruit can be eaten at noon.

DAY OF ROTATION	MEATS POULTRY FISH	VEGETABLES	FRUITS	BEVERAGES HOT DRINKS BOILED WATER OR HERBAL TEAS	GRAINS WHEAT, RICE OATS, TAPIOCA BARLEY, RYE CORN, BUCKWHEAT	REMARKS USE NUT FAMILIES AS SUPPLEMENT
1	BEEF CHEESE	COMPOSITE FAMILY LETTUCE, ENDIVE ARTICHOKE FUNGI MUSHROOM, YEAST	ROSE FAMILY STRAWBERRY RASPBERRY PALM FAMILY COCONUT,DATE	MILK	WHEAT	LECYTHIS FAMILY BRAZIL
2	FISH	PARSLEY FAMILY CARROT, CELERY PARSNIP POTATO FAMILY TOMATO, GREEN PEPPERS	CITRUS FAMILY LAUREL FAMILY AVOCADO	ORANGE JUICE, ETC.	RYE	BIRCH FAMILY FILBERT HAZELNUTS
3	EGGS POULTRY	LILY FAMILY ASPARAGUS, ONION GOURD FAMILY SQUASH CUCUMBER, ETC.	BANANA PINEAPPLE HEATH FAMILY CRANBERRY	PINEAPPLE JUICE	RICE	CASHEW
4	PORK BACON HAM	GOOSE FOOT FAMILY BEET, SPINACH MORNING GLORY FAMILY - SWEET POTATO, YAM	GRAPE FAMILY RAISINS GRAPES APPLE FAMILY	GRAPE JUICE APPLE JUICE	CORN	WALNUT
5	LAMB RABBIT FISH	LEGUME FAMILY PEAS, BEANS MUSTARD FAMILY BROCCOLI, TURNIP CAULIFLOWER	PLUM FAMILY CHERRIES PEACHES MINT	MINT TEA	OATS	PEANUTS (LEGUME FAMILY) ALMONDS (PLUM FAMILY)

DIFFERENT FAMILIES OF FOODS EACH DAY. USE FRESH OR FROZEN FOODS. AVOID TINS.

3. THE FOOD FAMILY LIST

A person allergic to one food is usually allergic to other foods of the same family. This is especially true of plant foods. Peanut, for example, belongs to the pea or legume family, and people who cannot eat peanuts usually cannot eat beans and peas. But they are not necessarily allergic to other nuts. Patients allergic to wheat are often allergic to rice and barley and other grains, but not to buckwheat, a member of another family. Potatoes are related to tomatoes, but not to sweet potatoes. Almonds are related to peaches, but not to pecans. Tuna and salmon are true fish and are related to each other, but not to clams or crabs. And clams and crabs are not related. Tea and coffee are not related, but chocolate and cola (used in cola drinks) are. Carrots and celery are relatives; black pepper and red pepper are not. These and other relationships are shown in the following list. The more important foods are given in capitals.

PLANT FAMILIES

Apple.	APPLE, PEAR, quince
Buckwheat	BUCKWHEAT, RHUBARB
Cashew.	CASHEW NUT, PISTACHIO, mango
Citrus.	ORANGE, LEMON, LIME, GRAPEFRUIT, TANGERINE, kumquat, citron
Cola Nut.	CHOCOLATE (COLA), COLA
Fungi.	Yeast, mushroom. Inhalant moulds are related to yeast
Goosefoot.	BEET, SPINACH, Swiss chard, lamb's quarters
Gourd (Melon).	WATERMELON, CUCUMBER, CANTALOUPE, pumpking, squash
Grass (Grains, Cereals).	WHEAT, CORN, RICE, OATS, BARLEY, RYE, wild rice, brown can sugar, bamboo sprouts, malt.
Heath.	BLUEBERRY, CRANBERRY, huckleberry
Laurel.	CINNAMON, BAY LEAF, avocado, sassafras
Lily.	ONION, GARLIC, ASPARAGUS, chives, leek, sarsparilla

Mallow.	Okra, cottonseed flour
Mint.	MINT, SAGE, THYME, PEPPERMINT, SPEARMINT, OREGANO, basil, horehound, marjoram, savory, rosemary
Mustard.	MUSTARD, TURNIP, RADISH, HORSERADISH, CABBAGE, CAULIFLOWER, BROCCOLI, BRUSSELS SPROUTS, Chinese cabbage, collard, kale, watercress, rutabaga, kohlrabi
Myrtle.	ALLSPICE, CLOVE, guava
Nightshade.	TOMATO, POTATO, PEPPERS, RED PEPPER, EGG PLANT, TOBACCO, cayenne, paprika, pimiento, chili pepper, (Includes all "pepper" but black).
Palm.	COCONUT, DATE
Parsley.	CARROT, CELERY, PARSNIP, PARSLEY, DILL, CELERY SEED, CUMIN (comino), CORIANDER, caraway, anise, angelica, fennel.
Pea (Legume).	PEAS, BLACK-EYED PEAS, NAVY, LIMA, STRING, SOX, etc., PEANUTS, licorice, acacia, tragacanth.
Plum.	ALMOND, PLUM (prune), PEACH, APRICOT, CHERRY, nectarine
Rose.	STRAWBERRY, BLACKBERRY, RASPBERRY, other bramble berries.
Sunflower.	LETTUCE, chicory, endive, escarole, artichoke, dandelion, sunflower seeds, tarragon, Ragweed and pyrethru are related inhalants.
Walnut.	BLACK and ENGLISH WALNUT, PECAN, hickory, butternut.

PLANT FOODS WITHOUT RELATIVES

These foods represent the only members of their families that are commonly eaten. They therefore are not related to each other or to other foods on this list:

BANANA, BLACK (WHITE) PEPPER, BRAZIL NUT, COFFEE, FIG, GINGER, GOOSEBERRY, (CURRANT), GRAPE, RAISIN, HAZELNUT, HONEY, NUTMEG, OLIVE, PINEAPPLE, SWEET POTATO, TEA, VANILLA, arrowroot, capers, chestnut, chicle, elderberry, juniper, flaxseed, karaya gum, maple sugar, New Zealand spinach, papaya, persimmon, poppyseed, saffron, sesame seed, tapioca, wintergreen.

ANIMAL FOODS

Mollusks.	Oyster, clam, abalone, mussel
Crayfish.	SHRIMP, CRAB, LOBSTER
Fish.	All true fish such as Tuna, Salmon, Catfish, Perch, etc.
Birds.	CHICKEN, turkey, duck, goose, quail, etc. EGG
Mammals.	BEEF, PORK, LAMB, venison, squirrel, etc. COW'S and GOAT'S MILK

MISCELLANEOUS

Such coal tar products as FOOD COLOUR, ASPIRIN, and SULFA DRUGS may cause allergy. Also ANTIBIOTICS, quinine, barbiturates, tranquilizers.

4. ORGANIC GARDENING

No organic gardener disputes the accumulated knowledge of plant biology nor the need for nitrogen, phosphorous, potassium and many trace elements. The difference between the chemical and organic gardener is that the latter unlocks nutrients already in the soil and makes them available to his crops rather than adding a limited number of them - usually nitrogen, phosphorus and potassium - by means of a chemical fertilizer.

We can assume that the sun and rain will always arrive on time to do their part so that the gardener's problem is to provide good soil and a pest-free location.

In nature the plants and trees live on the composted remains of their forebears with nothing lost. The animals' dead bodies are also returned to the soil. Over the years the food supply is even increased by the presence of nitrogen fixing plants. Farmers and gardeners must return to the soil what is taken out of it, but there is no need to use up precious energy sources to do this with fertilizers.

How to build up soil:

1. By crop rotation.
2. No burning.
3. Composting of all waste materials and putting them back.
4. Mulching with hay, straw or any organic material.
5. Manuring with organically derived materials like stable manure.
6. Growing legumes which fix nitrogen.
7. Use of natural materials to rectify phosphorous and potassium deficiencies such as granite dust for potassium if absolutely necessary.
8. Never allow soil to remain bare - have some crop such as rye, or mulch.
9. Do not use dangerous sprays and fertilizers.

Many will say, "I need these things badly but haven't enough time or energy for them". Much can be done with little time and energy.

To begin with, let's find out how much work is involved in some ordinary garden produce, compared with its value.

You can grow things that will keep well without freezing, say onions. What is involved: Dig a patch of soil 18" deep x 20'-30' long. Buy some Dutch onion sets, stick them in, watch them grow, apply a mulch of straw, hay, shavings or paper. Pull them up in the fall (do not cut flowers or bend over). Allow to dry in sun. Store in cool, dry place, preferably, hang them up but they can also be kept in baskets. Estimated hours of work for fit person on sandy loam - 3 per year.

Squash: Dig 2 holes, 2' diameter, 1 spade deep, 12" apart. Add rotting turf, grass cuttings, compost, or well rotted manure - hay would even do. Fill again to make slight hill. Stick in seeds. Thin plants and watch them grow. Harvest and store in a cool place. Estimated hours of work - 2½ per year.

Dry beans, white or brown: About the same as for onions, except that the ripened seeds must be threshed or shelled from the pods. Store in dry place.

Carrots: Similar to onions but store in damp sand in cool cellar. Also leave in half a row to be dug as required when frost leaves the ground.

Dried peas: Similar to beans.

Potatoes: Much more work because of digging, earthing up, bug picking (no chemicals allowed), digging to harvest, but honestly worth it if you are fit. A row 40' long is usually enough for two Canadians.

And there are other root crops that keep, but the modern freezers have added tremendous variety to this list of winter keepers at, of course, the expenditure of work to freeze them.

These are good freezers, needing little trouble to grow or freeze:

Peas
Green and yellow beans
Italian Pole Beans
Sprouting Broccoli
Leeks
Asparagus
Broad Beans
Brussel Sprouts
Egg Plant
Green Pepper
Carrots
Corn

Fruits: Strawberries, Raspberries, Gooseberries, Currants Red and Black, Rhubarb, Tomato juice.

And, of course, it is not much trouble to grow lettuce and radishes. Tomatoes are more trouble if on poles, but not as much if grown in the field on the ground. Tilling is a problem to many. Members who have a garden should choose sandy loam for ease of working, but clay loam can, after heavy mulching, be made almost as workable. If you can't do the digging yourself it will pay you to have your land rototilled. Also have you soil tested and correct deficiencies by organic methods.

Mulches keep down weeds. Some weeds do not harm crops. A tidy or weedless garden is sometimes not worth the effort, and does not give better results. The soil should not be left bare. How about watering? This is not necessary if crops are mulched and except for some extreme circumstances is harmful in a garden.

How do you keep the insect pests from eating your crops? Using no chemicals or sprays yourself, you will find it is harder to bring back a natural balance in a small garden than in a big one, but eventually you will get this balance. Use companionate planting. Many pests hate onions, chives, hot red peppers (full of Vitamin A), garlic. Potato bugs do not like bean plants so plant rows of beans between the potatoes. Mix up your plants if possible. Aphids and flea beetles seem to dislike herbs such as basil and savory, so grow these close to tomatoes, and use them too. The old fashioned herb garden close to the back door was not only for convenience but to keep flies out of the house too (mint and sage). Pests do not do permanent damage to plants grown on good, well mulched soil. If necessary, insects can be plucked from plants by hand. Attract birds even though they may want to share your fruits a little. Set traps for some things like slugs (a saucer of beer) if you have too many and no toads.

"Companionate Planting" is the term used to describe the raising of certain plants in the garden to repel harmful insects that may attack other plants. Of course it is understood that clean, healthy plants grown in humus rich soils are less likely to be attacked by pests of any kind; therefore, a clean garden full of well cared for plants is fundamental protection. There are some sprays such as rotenone, ryania and pyrethrum derived from plants that are safe to use, but nevertheless they will kill harmless and helpful insects as well as harmful ones.

Companionate planting and organic gardening were practised in what our children now call "the olden days", and a herb garden close to the back door was not only for convenience but helped to keep insects away. Sprigs of herbs (mint against flies, sage too) were kept in the house too. Marigold roots give off a sulphur containing substance that discourages nematodes from multiplying in the ground. These microscopic creatures are persistent feeders on plant roots, tubers and bulbs and retard proper growth. A Dutch bulb grower found that by planting marigolds in his fields about three months before he set out his daffodil bulbs, the fields were cleared of nematodes. Plant basil and savory and hot red peppers amongst or alongside your tomatoes to repel flea beetles and tomato aphids - and then use them too; basil is a tasty addition to any tomato dish. Pick off the green horn worm by hand. Plant beans between rows of potatoes to help control the Colorado beetle, at the same time the potatoes will keep the Mexican beetle from the beans. You must daily search for the potato beetle and either squash them, trample them with your feet, or (the old fashioned way) drop them into a can of oil. Radishes can be planted close to cucumber and squash hills if you are troubled with cucumber beetles.

The flowers of the aster family will repel some insects, they can be planted amongst the vegetables, look pretty and be used for cutting (marigolds, chrysanthemums and asters). Plant any of the herbs, marjoram, savory, thyme, coriander, sage or hyssop, (and use them) by any of the cabbage family to keep butterflies out of the cabbage on which they lay their eggs. Garlic too will discourage many pests. The birds are excellent controllers of insects, encourage them the year round and plant enough fruit trees for them and you to enjoy.

Good garden housekeeping also includes good outdoor inspection. Learn to recognize egg cases and destroy those that belong to pests.

Some things to look for:
A sticky brown band around the twig end of a wild cherry or fruit tree...probably a tent caterpillar egg mass. Clip off and drop into paper bag to be burnt.
A light tan oval cluster on a tree trunk, stone or fence. Gypsy moths have been around...scrape off the egg case into the paper bag. A long lathery mass on the trunks and branches of shade trees inidcates Tussock moth eggs. Clip off and place in bag for burning.

BUT

Be on the lookout for a walnut sized frothy tan egg mass on shrubs and flower stalks. Don't touch! This belongs to the praying mantis, your garden's best friend. When they are young, they control soft bodied insects such as lice and flies. Later they eat grasshoppers and chinch bugs.

The lady bird or ladybug feeds on aphids, scales, mealybugs, many insect eggs and larvae, white flies, spider mites, and is considered one of the most effective predators.

5. THE PRESERVATION OF FOODS

A. FREEZING

All fruits, vegetables or their juices may be frozen without blanching. They will keep without any loss of vitamin or enzyme if fast-frozen from zero to 10 below, and held at that temperature. Under most circumstances however, in order to preserve quality and - more importantly - ascorbic acid, blanching is recommended.

i) Herbs

Basil
Dill
Marjoram
Mint
Parsley
Rosemary
Sage
Tarragon

Wash and drain,
chop
freeze in tray, and
pack dry.

ii) Blanching Times for Vegetables

Asparagus	2 minutes
Beans, Green	1 minute
Wax	2 minutes
Beets, Whole	Cook until tender, cool and freeze
Beet Greens	2 minutes
Broccoli	3-4-5 minutes depending on size
Brussels Sprouts	3-4-5 minutes depending on size
Carrots	3 minutes
Celery	2 minutes
Cabbage	1½ minutes
Corn on Cob	7 minutes
Corn creamed-cook on cob	4 minutes, cool and cut off
Eggplant	2 minutes
Kohlrabi	4 minutes
Mushrooms	2 minutes or steam scald 3 minutes
Okra	2 minutes
Parsnips	2 minutes
Peas	1 minute
Peppers	Not necessary--slices 2 minutes halves 4 minutes
Pumpkin and Squash	Cook, mash, cool and freeze
Turnip	2 minutes
Spinach	2 minutes

B. CANNING

i) To Can Without Sugar

Cook fruit in water till tender, put in sterile jars and seal.

ii) To Cold Pack Without Sugar

Place fruit in jars.
Cover with boiling water or juice of fruit, leaving head space.
Process in boiling water bath.
Peaches and pears pack better if placed with cut side down.

C. DRYING

HOW TO DRY FRUIT & VEGETABLES

Peaches, pears, apples, tomatoes, etc., are best blanched, skinned and sliced or quartered. Plums, apricots, cherries, etc. are best cut in halves. Vegetables sliced about ¼" thick.

Drying temperature should be 108 degrees F. or 42 degrees C. but not over 140 degrees F. Vitamin content is best maintained at the lower level.

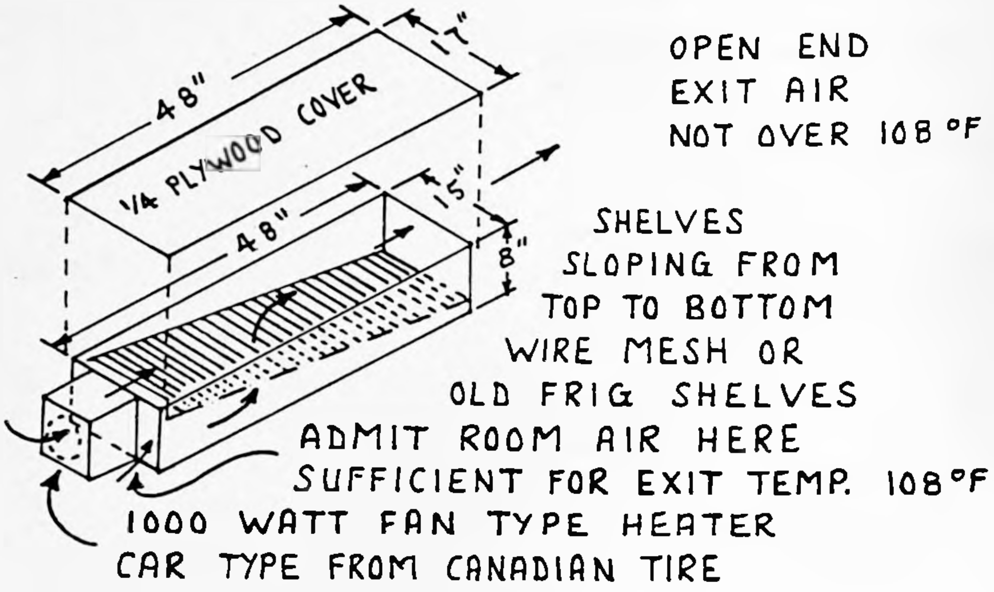
Drying time is 8 to 12 hours. Dry only until soft dry, then put in milk or plastic cartons or freezer bags and label, then store in your freezer.

This drying process preserves and concentrates the flavour of fruit picked at the peak of the season. Make sure every item is really nice and ripe before drying. There is no loss of vitamin except for a small loss of C due to cutting up before drying. It is rated at only slightly less than class one food, which is food in the natural state.

Home dried fruit is delicious and vegetables are good in normally cooked meals. It is also free of additives and preservatives found in commercially dried foods.

DRY YOUR OWN FRUIT ETC.

HOW TO MAKE YOUR DRIER



a. Make a Box 4' Long, 8" High x 15" Wide with open end and a lift off lid similar to above sketch. You need a piece of ¼" Plywood 4' Square

b. You need 2 stainless shelves from an old frig or other wire mesh screen.

c. You need a fan type heater about 1000 watts, such as sold as a car heater by Canadian Tire.

1. Mount the drying shelf sloping from end to end, so that the drying air will go under and over the shelf.

2. Keep the exit temperature at not over 108 degree F. or 42 degree C.

6. THE PREPARATION OF FOOD

Some changes in your usual methods of preparing and cooking foods may be necessary. In particular, the following points must be kept in mind:

1) the Rotary Diet may prevent a particular combination of foods;
2) it may be necessary to eliminate some foods from your diet completely;
3) processed foods should be avoided;
4) because of the above, it will be necessary to purchase only whole, natural foods, and prepare them at home, usually as simple, single dishes (fewer familiar stews and casseroles, unless the ingredients are all "for the day" and allowed on your diet).

On the positive side, these need not restrict the variety of food you eat. In fact, you will probably discover a whole range of new foods and new recipes. Cooking under these circumstances can become an exciting adventure, and every meal a gourmet experiment (admittedly not always successful). There are very many cookbooks available which feature recipes from every corner of the world and deal with the preparation of every kind of vegetable, fruit, fish, and animal known to man in an almost infinitive variety of ways. Browse and invent. Good starters are Very Basically Yours, a publication of the Human Ecology Study Group (Chicago), and a cookbook compiled by the Hamilton Branch of the Human Ecology Foundation of Canada. The Rodale Cookbook from the Rodale Press in Emmaus, Pennsylvania, is also very useful.

Bon appetit!

a) SUBSTITUTES

1 cup whole wheat flour	- 3/4 cup cornmeal 1½ cups fine oatmeal
1 cup white flour	- 1½ cups oat flour 7/8 cup rice flour 3/4 cup buckwheat flour 1 3/8 cups barley flour 3/4 cup potato flour 7/8 cup cornmeal
1 cup arrowroot flour	- equal amount of tapioca or potato flour
2 tbsps. flour	- 1 tbsp. cornstarch - 1 tbsp. arrowroot starch

2 tsp. baking powder = ½ tsp. baking soda plus 1 tsp.
cream of tartar

1 cup granulated sugar = 1 cup raw sugar
1½ cups brown sugar
1 cup honey

In cakes, cookies, etc., allow ½ tsp. baking soda and deduct 3 tbsps. of liquid for each cup of honey used in recipe.

1 cup milk = 1/3 cup skimmed milk powder
dissolved in enough water to
fill cup

½ pint whipping cream - ½ cup water
2/3 cup skim milk powder
1 tbsp. lemon juice
pinch salt

Combine and beat until stiff, about 5 minutes. Sweeten if desired.

b) HELPFUL HINTS FOR FOOD

1. Don't forget juices of vegetables and fruits may be frozen. Be sure to do enough until the next growing season.

2. Blender. There is an endless number of things that can be done with your blender to preserve the enzymes in your fruits or vegetables. Investigate.

3. Foods can be frozen in serving portions or in bulk pack. To help keep foods from freezing together pack unfrozen foods on a flat tray or a cookie sheet and freeze. Then place in bulk container. Take out portion needed for each meal.

4. Glass is the preferred container for freezing. Of course it takes more room. Parchment paper has been found an acceptable wrap for most people. Some can tolerate the non-toxic plastic bags, some foil or freezer wrap. It is advisable to wrap first in parchment if using either of these. They are a big help in preventing freezer burn and drying.

5. Baby food jars are excellent for storing individual servings of food.

6. Freezer wrap and parchment are available at G.T. French Paper Limited, 107 MacNab Street North, Hamilton, Ontario.

c) KITCHEN UTENSILS

1. Avoid Aluminum and Plastic containers.
2. Stainless steel, Pyrex and Corningware are recommended.
3. For storing food in cupboard, refrigerator or freezer, glass jars are preferred.
4. Cast iron frying pans and enamel wear are satisfactory.
5. Do not use Teflon coated utensils.
6. SteaMarvel (available at health food stores) is excellent for steaming all kinds of food.
7. Cuisinart - really superior blender, juicer, etc. Available at big department stores.

APPENDIX I

THE CLASSIFICATION OF FABRICS

It is important to the chemically sensitive person to pick and choose carefully the materials that he or she wears. Synthetic materials, blended materials (part synthetic and part natural fibre), and chemical finishes added to natural fibre materials should be avoided. It has been found that rayon and acetate are the best tolerated synthetic materials, but these too may cause troublesome reactions to the highly susceptible patient.

Clothing or yard goods made of natural fibres can be found. These are wool, cotton, linen and silk. Today many materials made of these fibres have been chemically treated to provide modern, easy care fabrics. These are chemical processes involving resins, insecticides, formaldehyde and other substances to which most chemically sensitive patients react. These appear under various descriptive names such as scotch guarding, drip dry, sanitizing, moth proofing, easy care, preshrunk, little or no ironing, shrink resistant (woollens) and numerous others. Watch for these labels! Plastic starches are used in some cottons, particularly in sheets. This cannot be washed out and should be avoided.

Presently almost all dyes used are synthetic variations of the basic aniline dyes. This is derived from a hydrocarbon-benzine. Most of the present day dyes are fairly well tolerated. However, we are working on the possibility of the extremely sensitive person being able to purchase raw natural fibres and making their own vegetable, animal or mineral dyes.

Fibres are broadly classified into natural and man-made fibres. Among the natural fibres there are organic fibres made by living plants and animals. Natural fibres are fibrous as they exist in nature, and may be utilized as fibres by processing them with comparatively simple physical processes.

Man-made fibres are also classified into fibres made from organic material obtained from plants and animals and those made from inorganic material through artificial synthesis. Both are made by artificial processes.

Man-made fibres are known by generic terms and trade names. A group of synthetic fibres having a similar chemical composition is known by a generic term, while a trade name is used to distinguish the fibre made by a manufacturer from similar fibres made by other makers. Such trade names are registered to prevent them from being used by other manufacturers.

CLASSIFICATION OF FIBRES

I. NATURAL FIBRES

- A. Vegetable fibre
  - Seed fibre
    - Cotton
    - Kapok
  - Bast fibre
    - Flax--linen
    - Ramie
    - Jute
    - Hemp
    - Indian mallow
    - Kenaf
  - Leaf fibre
    - Abaca
    - Sisal
    - New Zealand hemp
    - Cantala
  - Fruit fibre--Coir
- B. Animal fibre
  - Silk
    - Mulberry silk...tussan silk
    - Wild silk...yamamai silk
  - Animal Hair
    - Wool
    - Goat Hair
      - Mohair
      - Cashmere
      - Goat Hair
    - Camel Hair
      - Camel
      - Vicuna wool
      - Alpaca hair
    - Llama Hair
    - Horsehair
- C. Mineral fibre------------------Asbestos

II. MAN-MADE FIBRES

- A. Man-Made Organic Fibre
  - Regenerated Fibre
    - Cellulose Base (Rayon)
      - Viscose Rayon-Polynosic Rayon
      - Cupraammonium
      - Saponified Acetate
    - Protein Base
      - Animal Protein--Casein
      - Vegetable Protein
        - SoyBean Protein
        - Peanut Protein
        - Corn Protein
  - Semi-Synthetic Fibre
    - Cellulose Base
      - Acetate
      - Tri-Acetate
      - Acetylated Rayon
  - Synthetic Fibre
    - Condensation Polymerization
      - Polyamide Fibre
      - Polyester Fibre
      - Polyurethane Fibre
    - Addition Polymerization
      - Polyolefin Fibre
        - Polypropylene Fibre
        - Polyethylene Fibre
      - Polyvinyl Chloride Fibre
      - Polyvinylidene Chloride Fibre
      - Polyfluoroethylene Fibre
      - Polyvinylalcohol Fibre
      - Polyacrylonitrile (Acrylic) Fibre
      - Modacrylic Fibre
- B. Man-Made Inorganic Fibre
  - Tinsel Thread
  - Silicate Thread
    - Glass Fibre
    - Rock Fibre
    - Slag Fibre

Pure cotton, linen, silk and wool are our favourite fabrics. Takes perserverance.

WARNING -- When shopping for 100% untreated cotton articles of clothing or yard goods, be sure to carry a small bottle of water with you. Pure cotton will absorb the drops of water immediately. In other material, the water will stand in little balls or be absorbed very slowly depending upon the degree to which it has been treated.

Salespeople can be knowledgeable in fabric shops or factory outlets.

The large department stores appear to be the best sources, i.e. Eaton's, The Bay, Simpson-Sears.

The Robert Simpson Co. of Toronto have a supply of Liberty cotton prints. They also carry Triumph silk hose

The T. Eaton Co. of Hamilton usually have cotton yard goods such as denim, gingham, batiste in delicate shades and Swiss embroidered cotton. They also have silk pongee.

Avoid nylon elastic and nylon lace on cotton underwear. These can cause discomfort.

APPENDIX 2

AIR PURIFICATION
FOR HOMES AND AUTOMOBILES
USING ACTIVATED CHARCOAL
FILTERS

Activated Charcoal purifies air by removing odour and irritating vapours; it does not mask one odour with another. It has the ability to absorb virtually all organic vapours and many inorganic compounds and vapours, and is used as the principal purifying agent in space capsules and atomic submarines.

Recirculating air through activated charcoal eliminates the need for adding outside air, and it reduces the loss of expensive heated and cooled air.

Activated charcoal is widely used for air purification in auditoriums, theatres, hospitals, schools, hotels, government buildings, office buildings, retail stores, industrial plants, warehouses, restaurants, homes, in fact any occupied or used space.

Activated carbon will absorb up to 50% of its weight with odour and retain them in the vast network of extremely small pores within the body of the carbon. The porous structure of a pound of activated charcoal (approximately 50 cubic inches) approximates six million square feet of surface area.

In an effort to give a lay person a better understanding of the benefits which may be derived from using activated charcoal, the following four condition rating system has been devised for approximately 300 contaminant vapours which can be removed by a single pass through an activated charcoal filter.

Activated charcoal's capacity to remove odour does vary with gas concentration in the air, with humidity, with temperature, and with odour velocity.

*Condition 4:
Activated carbon has a high capacity for all materials in this category, which included most odour causing substances. One pound absorbs 20% to 50% of its own weight (average about 33 1/3%).

Condition 3:
Activated carbon has a satisfactory capacity for materials in this category. These constitute good applications taking about 10% to 25% of its own weight (average about 16.7%).

Condition 2:
Included substances which are not highly absorbed, but which might be taken up sufficiently to give good service under the particular conditions of operation. These require individual checking.

Condition 1:
Absorption capacity is low for these materials. Activated charcoal cannot be satisfactorily used to remove them under ordinary circumstances.

* - Straight activated charcoal does not have much capacity for some reactive gases, such as ammonia, formaldehyde, etc. In some cases where the gas is chemically reactive, appropriate impregnated activated charcoal can be recommended. The odorants shown in the lists with an asterisk fall into this category.

Condition #4 - General

ADHESIVES
AIRWICK
ALCOHOL
ANTISEPTICS
ASPHALT FUMES
BATHROOM SMELLS
BODY ODOURS
BURNED FLESH
BURNED FOOD
BURNING FAT
CANCER ODOUR
CHARRED MATERIALS
CHEESE
CHLOROFORM
CIGARETTE SMOKE
CITRUS AND OTHER FRUITS
CLEANING COMPOUNDS
COOKING ODOURS
CRESOL
DEAD ANIMALS
DECAYING SUBSTANCES
DECOMPOSITION ODOURS
DEODORANTS
DETERGENTS
DISINFECTANTS
EMBALMING ODOURS
FECAL ODOURS
FEMALE ODOURS
FERTILIZER
FISH ODOURS
FLORAL SCENTS
FOOD AROMAS
GANGRENE
GARLIC
GASOLINE
HOSPITAL ODOURS
HOUSEHOLD SMELLS
INCENSE
IODINE
KEROSENE
KITCHEN ODOURS
LIQUID FUELS
LIQUOR ODOURS
LUBRICATING OILS AND GREASES
LYSOL
MASKING AGENTS
MEDICINAL ODOURS
MELONS
MENTHOL
MIXED ODOURS
MOTH BALLS
NAPTHA (COAL TAR)
NAPTHA (PETROLEUM)
NICOTINE
ONIONS
ORGANIC CHEMICALS
OZONE
PACKING HOUSE ODOURS
PAINT AND REDECORATING ODOURS
PAPER DETERIORATIO
PERFUMES, COSMETIC
PERSPIRATION
PERSISTANT ODOURS
PET ODOURS
PITCH
PLASTICS
POPCORN AND CANDY
POULTRY ODOURS
RANCID ODOURS
RESINS
RIPENING FRUITS
RUBBER
SAUERKRAUT
SEWER ODOURS
SMOG
SMOKE
SOAPS
SOUR MILK
SPILLED BEVERAGES
SPOILED FOOD
STALE ODOURS
STUFFINESS
TAR
THEATRE MAKE-UP OD
TOBACCO SMOKE
TOILET ODOURS
TURPENTINE

VARNISH FUMES
VINEGAR
WASTE PRODUCTS
WATERPROOFING COMPOUNDS
PASTES AND GLUE

Condition #4

CHEMICAL	USED IN THE MANUFACTURE OF THE FOLLOWING PRODUCTS AND PROCESSES
ACETIC ACID	Adhesives, cleaners, cosmetics, drugs, fabrics, food, lacquers, plastics.
ACRYLIC ACID	Detergents, paints, rubber, varnish.
ACRYLONITRILE	Grain fumigant, plastics, rubber
AMYL ACETATE	Dyeing, films (picture), flavouring, lacquers, paints, perfume, solvents, tannins, varnish, waterproofing.
AMYL ALCOHOL	Pharmaceutical preparations.
AMYL ETHER	Films (picture), perfume, solvents.
ANILINE	Dyeing, explosives, paint, perfume, pharmaceuticals, varnish.
BENZENE	Large variety of chemicals and solvents.
BROMINE	Disinfectants, leather, poison gas, water purification.
BUTYL ACETATE	Dope, flavouring, lacquer, plastic wood, solvents, washable wallpaper.
BUTLY ALCOHOL	Brake fluid, cleaners, drugs, fabrics, flavouring, lacquers, paint remover, perfumes, films, shellac, solvent, varnish, waxes.
BUTYL CELLOSOLVE	Cleaners, enamels, fabrics, lacquers, solvents, varnish.
BUTYL CHLORIDE	Solvents.
BUTYL ETHER	Solvents.
CAMPHOR	Embalming, explosives, film, insecticides, lacquers, medicines, moth preventatives, plastics, tooth powders.

Condition #4 - Continued...

CHEMICAL	USED IN THE MANUFACTURE OF THE FOLLOWING PRODUCTS AND PROCESSES
CAPRYLIC ACID	Antiseptics, drugs, dyes, fungicides, perfumes.
CARBON TETRACHLORIDE	Cleaners, fire extinguishers, grain fumigant, lacquers, lubricants, soaps, solvents, metal polishes, perfumes, rubber products.
CELLOSOLVE	Cleaners, dyeing, lacquers, solvents, stains.
CHLOROBENZENE	Drugs, dyes, insecticides, perfumes, poison gas, solvents.
CHLOROBUTADIENE	Synthetic rubber
CHLOROPICRIN	Dyes, fumigants, fungicides, insecticides poison gas.
CRESOTE	Antiseptic medicine, disinfectants, poisons, wood preservatives.
CROTONALDEHYDE	Chemical warfare, insecticides, solvents, tanning.
CYCLOHEXANE	Paint and varnish remover, solvents.
CYCLOHEXANONE	Aerosols, cleaners, dyeing, paint and varnish remover, stain remover, solvents.
CYCLOHEXANOL	Cleaners, fabrics, paint and varnish remover, plastics, soap making, solvents.
DECANE	Solvents.
DIBROMOETHANE	Gasoline, grain fumigant, medicines, oils, solvents, waterproofing, waxes.
DICHLOROBENZENE	Cleaning compounds, fumigant, metal polishes, oils, paints, solvents, varnishe waxes.
DICHLOROETHANE	Cleaning compounds, fumigants, soaps, solvents.
DICHLOROETHYLENE	Solvent for oils, gums, resins, waxes, rubber, shellac, and cellulose acetate, solvent mixtures for celluloseesters and esthers, dye, extraction perfumes, lacquer thermo plastics, rubber, organic synthesis, medicines.

Condition #4 - Continued...

CHEMICAL	USED IN THE MANUFACTURE OF THE FOLLOWING PRODUCTS AND PROCESSES
DICHLOROETHYL	Ether - solvent for fats, oils, waxes, gums, tar, pectins, resins, insoluble soaps, organic synthesis, paints, varnishes, lacquers, finish removers, spotting and dry cleaning, soil fumigant.
DICHLORO NITHORTHENE	Solvent for oils, greases, rubber, resins, and bituminous materials, tar, degreasing of metals, insecticides, soil fumigant.
DICHLOROPROPANE	Solvent for fats, oils, waxes, gums and resins, dry cleaning fluids, scouring compounds, spotting agents, metal degreasing agents, fumigants.
DIETHYL KETONE	Medicine, organic synthesis.
DIMETHYLAMINE	Acid gas absorbent, solvent, antioxidants, dyes, soaps, and cleaning compounds.
DIMETHYSULPHATE	Methylating agent for amines and phenols, military poison gas.
DIOXANE	Solvent for fats, greases, oils, paints, varnishes, plastics, dyes, cleaning and detergent preparations, cements, cosmetics, deodorants, fumigants, polishing compositions, shoe creams.
DIPROPYL KETONE	Solvent for nitrocellulose, oils, synthetic resins, lacquers.
ETHYL ACETATE	Medicines, solvents, flavourings, perfumes, fruit essences, confections, artificial leather, varnishes, lacquers, plastics, pharmaceuticals, rayons.
ETHYL ACRYLATE	Molded objects of both decorative and functional types, windows, and containers, application to textiles.
ETHYL BENZENE	Solvents and dilutants, intermediate in the production of styrene.
ETHYL MERCAPTON	Explosives
ETHYL SILICATE	Preservative for stone, brick, concrete, plastic, molded objects, chemical and heat resistant paints, protective coatings.

Condition #4 - Continued...

CHEMICAL	USED IN THE MANUFACTURE OF THE FOLLOWING PRODUCTS AND PROCESSES
ETHYLENE CHLORHYDRIN	Solvent for acetate, synthesis of novocaine, to activate sprouting of dormant potatoes.
ETHYLENE DICHLORIDE	Solvent for fats, oils, waxes, fumigants, dry cleaning, lacquers, paints, varnish, soaps and scouring compounds.
EUCALYPTOLE	Phamisul, pharmaceuticals, flavouring, perfumes.
HEPTANE	Organic synthesis.
HEPTYLENE	Organic synthesis.
INDOLE	Chemical reagent, perfumes, medicines.
IDOFORM	Medicines.
ISOPHORONE	For air-dried and baked finished, nitrocellulose lacquers.
ISOPROPYL ACETATE	Solvent for fats, oils, waxes, gums manufacture of dopes, films, lacquers, plastics and perfumes.
ISOPROPYL ALCOHOL	Medicines, manufacture of acetone, solven for oils, gums, resins, mixer in liniment skinllotions, cosmetics, and creams, pharmaceuticals, mouth washes, hair tonics, perfumes, lacquers, antifreeze.
ISOPROPYL ETHER	Solvent for animal, vegetable, mineral oils and waxes, dyes, paint and varnish removers, rubber cements.
MESITYL OXIDE	Solvent for cellulose esters and ethers, oils, gums, lacquers, coating inks, paint and varnish removers, insect repellants.
METHYL ACUFATE	Paints and varnishes, synthetic rubber, washing and cleaning agents.
METHYL BUTUL KETONE	Solvent.
METHYL CELLOSOLVE	Solvent for nitricellulose, lacquers, enamels, varnish, perfume, stains, transparent wrapping materials.
METHYL CELLOSOLVE ACETATE	Solvent for nitrocellulose, gums, resins, waxes, oils,photographic film, lacquers and dope.

Condition #4 - Continued...

CHEMICAL	USED IN THE MANUFACTURE OF THE FOLLOWING PRODUCTS AND PROCESSES
METHYL CHLOROFORM	Manufactured medicines.
METHYL ETHYL KETONE	Solvent for oils, fats, waxes, gums and resins.
LACTIC ACID	Textiles, medicines, brewing, distilling liquors
METHYLCYCOHEXANE	Solvent for cellulose ethers, organic synthesis.
METHYLCYCOHEXANOE	Solvent for cellulose esters, lacquers, blending agent for soaps and detergents.
METHYL CHLORIDE	Solvent for alkaloids, oils, resins, waxes, solvent mixtures, lacquers, dentistry, perfumes, drugs, aerosols.
NAPTHALENE	Chemicals, dyes, insecticide and fungicide, explosives, lubricating compounds, asphalt, solvent varnishes.
NITRO BENZENE	Dust preventives, metal polishes, shoe polishes.
NITRO ETHANE	Solvent for nitrocellulose, vinyl, alkyd, resins, waxes, fats, chemical synthesis.
NITRO GLYCERINE	Explosives - dynamite, medicines.
NITRO METHANE	Solvent for nitrocellulose, vinyls, alkyds, resins, waxes, fats, chemical synthesis.
NITRO PROPANE	Solvent for resins, waxes, fats and dyestuffs.
NITRO TOLUENE	Synthetic dyes.
NONANE	Organic synthesis.
OCTYLENE	Organic synthesis.
OCTANE	Solvent, organic synthesis.
PALMITIC ACID	Manufacture of various metallic palmitates.
PARADICHTORBENZENE	Insecticide, germicide, deodorants, dyes, mothproofing, fumigants.
PENTANONE	Solvent.

Condition #4 - Continued...

CHEMICAL	USED IN THE MANUFACTURE OF THE FOLLOWING PRODUCTS AND PROCESSES
PERCHLOROETHYLENE	Solvent, pharmaceuticals, drycleaning, degreasing, dope, medicines
PROPIONIC ACID	Mold inhibitor in bread, electroplating, perfumes, artificial fruit flavours, solv
PROPYL ACETATE	Flavouring agent, perfumes, solvent, lacquers, plastics, organic synthesis.
PROPYL ALCOHOL	Organic synthesis, solvent, polishing compositions.
PROPYL CHLORIDE	Solvent, dry cleaning, scouring compounds metal degreasing agents, fumigant.
PYRIDINE	Denaturant for alcohol, solvent for rubbe paint, medicines, dyeing.
STODDARD SOLVENT	Dry cleaning solvent.
STYUNE MONOMU	Synthetic rubber, resins for organic synthesis.
SULFURIC ACID	Fertilizers, petroleum refining paints, explosives, textiles, multitude of chemic and noise uses.
TETRACHLOROETHENE	Solvent, pharmaceuticals, dry cleaning, degreasing, dope, medicines.
TOLUENE	Lacquers, medicines, dyes, perfumes, solvent.
TOLUIDINE	Dyes, vulcanizing, organic synthesis.
TRICHTOROETHYLENE	Solvent for chewing gum, oils, waxes, grease, tar, etc., organic synthesis, insecticide, dry cleaning, soaps, paint and varnish removers.
UREA	Medicines, explosives, organic synthesis, adhesives, fertilizers, animal feeds, fire resistant paints.
URIC ACID	Organic synthesis.
VALERIC ACID	Medicines, flavours, perfumes.
XYLENE	Dyes and organic chemicals, solvent for lacquers, enamels and rubber cements.

Condition #3 - General

ACIDS
ANIMAL ODOURS
ANESTHETICS
AUTOMOBILE EXHAUST
BACTERIA
*BLEACHING SOLUTIONS
*CHLORINE
COAL SMOKE
COMBUSTION ODOURS
*CORROSIVE GASES
DIESEL FUMES
ETHER
EXHAUST FUMES
FABRIC FINISHES
FILM PROCESSING ODOURS
INORGANIC CHEMICALS
INCOMPLETE COMBUSTION
INDUSTRIAL WASTES
MILDEW
MOULD
NOXIOUS GASES
POISON GASES
PUTREFYING SUBSTANCES
SLAUGHTERING ODOURS
SOLVENTS
SULPHUR COMPOUNDS

Condition #3 - General - continued...

*TARNISHING GASES

VIRUSES

VOLATILE MATERIALS

WOOD ALCOHOL

CHEMICAL	USED IN THE MANUFACTURE OF THE FOLLOWING PRODUCTS AND PROCESSES
ACETONE	Solvent for varnishes, lacquers, dope, dyes, adhesives, lubricants, perfumes, pharmaceuticals, plastics, cements, component in aerosols.
*ACROLEIN	Organic synthesis, poison gas, disinfectant.
BUTADIENE	Manufacture of synthetic rubber and drugs
*BUTYRALDEHYDE	Rubber goods, rubber cements, flavouring extract, organic synthesis.
CARBON BISULFIDE	Medicines, solvent for fats, resins, rubber, waxes, varnishes, lacquers, fumigant, preservative, insecticide.
DICHLORODIFLUOROMETHANE	Refrigerant.
DICHLOROTETRAFLUOUTHANE	Refrigerant.
DICHLOROTETRAFLUOUTHANE	Solvent, organic synthesis, pharmaceuticals, medicines, dyes.
*DIETHYL AMINE	Rubber chemicals, textiles, solvent, dyes, pharmaceuticals.
*ETHYL AMINE	Solvent in petroleum and oil refining dyes, self-polishing waxes.
ETHYL BROMIDE	Organic synthesis, medicines, refrigerant
ETHYL CHLORIDE	Medicines, organic synthesis, solvent for fats, oils, resins and waxes, insecticide

Condition #3 - Continued...

CHEMICAL	USED IN THE MANUFACTURE OF THE FOLLOWING PRODUCTS AND PROCESSES
ETHYL FORMATE	Fumigant, synthetic flavours, medicines.
ETHYLENE OXIDE	Organic synthesis, fumigation.
FLUOROTRICHLOROMETHANE	Organic synthesis.
*FORMIC ACID	Dyes, fumigants, insecticides, solvent for perfumes, lacquers, brewing, food preservation.
FREON	Refrigerant, propellant for insecticide, aerosols.
HEXANE	Solvent.
*HEXYLENE	Oil additive, drugs, insecticides.
*HEXYNE	Perfumes, plastics, medicinals, pharmaceuticals, plastics, organic synthesis.
*HYDROGEN CYANIDE	Fumigant, medicines, poison gas.
*HYDROGEN IODIDE	Medicine, organic preparations, disinfectant, pharmaceuticals.
*HYDROGEN SULFIDE	Manufacture of sulfur, purifies hydrochloric and sulfuric acids.
*ISOPRENE	Manufacture of rubber, resins, chemical intermediate.
METHYL ACETATE	Solvent, perfumes, plastics, paints, varnishes, lacquers.
METHYL ALCOHOL	Organic synthesis, antifreeze, solvent, paints, varnishes, disinfecting soaps, drycleaning, fuel, perfumes.
METHYL BROMIDE	Organic synthesis, solvent, refrigerant, fumigant.
METHYL CHLORIDE	Refrigerant, medicines, solvent
METHYL ETHER	Refrigerant, solvent, propellant
METHYL FORMATE	Organic synthesis, poison gas, fumigant.
METHYLAL	Solvent, perfumes, adhesives, protective coatings.

Condition #3 - Continued...

CHEMICAL	USED IN THE MANUFACTURE OF THE FOLLOWING PRODUCTS AND PROCESSES
MONOFLUOROTUCHLOROMETHANE	Refrigerant.
*NITRIC ACID	Organic synthesis, dyes, drugs, explosives, medicines, etching steel.
PENTANE	Manufacture of artificial ice, solvent.
*PENTYLENE	Organic synthesis, high octane, motor fue
*PENTYNE	Organic synthesis.
PHOSGENE	Poison gas, bleaching agent, dye, organic synthesis.
*PROPIONALDEHYDE	Manufacture of plastics, synthesis of rubber, chemicals.
*SULFUR TRIOXIDE	Sulfonation of organic compounds.
TETRAHYDROFURAN	Solvent for plastics and resins.
VINYL CHLORIDE	Refrigerant, plastics, organic synthesis.

Condition #2 - General

AMMONIA

FUEL GASES

PROPANE

RADIATION PRODUCTS

Condition #2

CHEMICAL	USED IN THE MANUFACTURE OF THE FOLLOWING PRODUCTS AND PROCESSES
*AMINES	Wetting agent, rubber chemicals, germicides.
BUTANE	Organic synthesis, high octane, liquid fuel, household fuel, solvent, refrigerant
*BUTYLENE	Chemical synthesis, gasoline.
*BUTYNE	Local anesthetic, perfumes, pharmaceuticals, organic synthesis.
*FORMALDEHYDE	Chemical agent, dyes, explosives, medicines, embalming, insecticide, photography, plastics, fertilizers.
*HYDROGEN BROMIDE	Pharmaceutical synthesis, alcohols, barbiturate, petroleum products.
*HYDROGEN CHLORIDE	Leather industry, organic synthesis, solvent, pickling agent, photography, medicines.
*HYDROGEN FLUORIDE	Catalyst in alkylation, production of fluoride.
*NITROGEN DIOXIDE	Manufacture of nitric acid, oxidizing agent, catalyst.
*PROPYLENE	Organic synthesis.
*PROPYNE	Solvent, lacquers, plastics, fumigant, organic synthesis.
*SULFUR DIOXIDE	Bleaching, preservative, artificial ice, refrigeration, disinfectant, fumigant.
Condition #1	
*ACETYLENE	Manufacture of dyes, explosives, synthetic rubber, fuel, welding and cutting.
*CARBON DIOXIDE	Organic synthesis, insecticide, fungicides, germicides, brewing, milk industry, antiseptic, propellant.
*CARBON MONOXIDE	Organic synthesis, fuel.
ETHANE	Organic synthesis, refrigerant, fuel.

Condition #1 - continued...

CHEMICAL	USED IN THE MANUFACTURE OF THE FOLLOWING PRODUCTS AND PROCESSES
*ETHYLENE	Colouring, increases growth of seedlings, blancher, poison gas, medicines.
HYDROGEN	Organic synthesis, welding, hydrogenation of napthalene, phenobs, oils.
METHANE	Fuel, carbon black.

In conclusion, although there are more than 1,000,000 chemicals and chemical compounds now on the market, and this list only covers about 1/600th of 1%, we can take comfort from the fact that activated charcoal is effective in removing odours of approximately 85% of all chemicals and chemical compounds.

The terms organic synthesis means - the use of carbon containing (organic) chemical compounds to make larger, more desirable compounds.

Reactivation:

Periodic reactivation of the activated charcoal is the only maintenance required. Effective life of the charcoal depends upon odour conditions. The average is two or more years in light duty and about one year in heavy duty. All homes would fall in the light duty classification.

In order to assist the chemically sensitive person in avoiding problem odour areas, the following odour index has been compiled:

Location "A" contains the lowest amount of odour, "B" and "C" represent levels in between, and "D" contains the highest amount of odour. Many of the classifications are rather general, so it is necessary to pick typical or average conditions. The odour index for a specific situation can vary somewhat from that given in the table if special circumstances apply. In typical cases, a pound of activated charcoal will purify the following amount of space for a year.

Location "A" - 2000 cubic ft.	Location "B" - 800 cubic ft.
Location "C" - 300 cubic ft.	Location "D" - 100 cubic ft.

Example:

If your home contained 1500 square feet of floor space and your ceiling height is 8 ft., you have approximately 12000 cubic ft. of air in your home. Therefore, since your home is a location "A" you divide 12000 by 2000, which equals 6 pounds of activated charcoal that would effectively clean the air in your home for one year. The filters can be used in the summer time by turning off your furnace, but leaving your furnace fan running continuously.

LOCATION "A"

APARTMENT BUILDING
APARTMENTS
BEDROOMS
CHURCHES
FORCED AIR FURNACE
GRAVITY RETURN FURNACES
HOMES
LIVING ROOMS
RESIDENCES
RETAIL SHOPS

LOCATION "B"

AIRLINE TERMINALS
AMUSEMENT PLACES
ART STUDIOS
AUDITORIUMS
BANKS
BATHROOMS
BINDERIES
BOOK STACKS
BUS TERMINALS
CAFETERIAS
CANNERIES
CIRCULATING FANS
CLOSETS
COMMERCIAL ESTABLISHMENTS
CORRIDORS
DEPARTMENT STORES
DINING ROOMS
DISPLAY PARLOURS
DRAFTING ROOMS
DRESSING ROOMS
EDUCATIONAL INSTITUTIONS
ELECTRICAL INSTITUTIONS
EQUIPMENT ROOMS
FEDERAL OFFICES
GREENHOUSES
GROCERY STORES
HOTELS
HOTEL ROOMS
INDUSTRIAL OFFICES
INSTITUTIONS
INSTRUMENT ROOMS
JEWELRY STORES
LIBRARIES
LOBBIES
LOUNGES
MAINTENANCE DEPARTMENTS
METAL INDUSTRIES
MILITARY INSTALLATIONS
MOTELS
MUNICIPAL OFFICES
MUSEUMS
NURSERIES
OFFICES
PLANES
PRIVATE OFFICES
PUBLIC BUILDINGS
RAILWAY STATIONS
READING ROOMS
RECEPTION ROOMS
REST ROOMS
RESTAURANTS
RUMPUS ROOMS
SALES ROOMS
SAMPLE ROOMS
SILVERWARE MANUFACTURERS
SODA FOUNTAINS
PROVINCIAL INSTITUTIONS
STEAMSHIPS
STOCK ROOMS
STORAGE SPACES
STORES
STUFFY ROOMS
SUPERMARKETS
SWITCHBOARD ROOMS

LOCATION "B" continued

THEATRES
TICKET BOOTHS
TRAINS
TRAIN RESERVATION OFFICES
UNIT AIR COOLERS
WAITING ROOMS
WAREHOUSES
WINDOW VENTILATORS
WOODWORKING PLANTS
YACHTS

LOCATION "C"

ADHESIVE MANUFACTURING PLANTS
AIR CONDITIONING PLANTS
AIRCRAFT
APPLE STORAGE
ATHLETIC CLUBS
AUTOMOBILES
BANK COUNTING ROOMS
BANK DEPOSIT ROOMS
BANQUET ROOMS
BARBERSHOPS
BARS
BASEMENTS
BEAUTY SHOPS
BREWERIES
BUSES
CENTRAL AIR COND. SYSTEMS
CLINICS
CLUB HOUSES
COCKTAIL LOUNGES
COLD STORAGE PLANTS
CONFERENCE ROOMS
CONVENTIONS
CREAMERIES
CROWDED ROOMS
DAIRIES
DARKROOMS
DENTISTS' OFFICES
DISTILLERIES
DOCTORS' OFFICES
DRUGSTORES
DRY CLEANING PLANTS
ELEVATORS
ENCLOSED SPACES
ENGINE ROOMS
EXAMINATION ROOMS
FACTORIES
FERMENTATION PLANTS
FISH MARKETS
FIVE AND TEN CENT STORES
FOOD PROCESSING
FRUIT STORAGE AREAS
FUNERAL HOMES
GAME ROOMS
GRILLS
HOSPITAL ROOMS
HOSPITALS
INCINERATORS
INDIVIDUAL CUBICLES
INDUSTRIAL KITCHENS
KITCHENS
LAUNDRIES
LIVE POULTRY ROOMS
LOCKER ROOMS
LUNCH COUNTERS
LUNCH ROOMS
MANUFACTURING PLANTS
MAUSOLEUMS
MEAT MARKETS
MEAT STORAGE
MILITARY EQUIPMENT
MIXED COLD STORAGE
MORGUES
MOTION PICTURE STUDIOS
NIGHT CLUBS
ODOUR BARRIERS
OFFICE BUILDINGS
OFFICERS' CLUBS
OPERATING ROOMS
PAINT PLANTS
PENAL INSTITUTIONS
PERSONNEL PROTECTION
PET SHOPS
PHARMACEUTICAL PLANTS
PHOTO DARKROOMS
PHOTOGRAPHIC INDUSTRY
PHOTOGRAPHIC STUDIOS
PLASTICS MANUFACTURING
PLATING SHOPS
POULTRY PROCESSING
POULTRY SALES ROOMS
PRESCRIPTION DEPARTMENTS
PRINTING PLANTS
PROCESSING LABORATORIES
PROCESSING ROOMS

LOCATION "C" continued

PUBLIC ASSEMBLY ROOMS
PUBLIC TOILETS
RADIO STUDIOS
RAILWAY CARS
RECOVERY ROOM, HOSPITAL
RECREATION HALLS
RECREATION ROOMS
REFINERIES
REFRIGERATED SHOWCASES
REFRIGERATORS
RESEARCH BUILDING
RESEARCH OFFICES
RESTAURANT KITCHENS
SCHOOLS
SERVICE DEPARTMENT
SEWAGE PISPOSAL PLANTS
SHOWCASES
SICK-ROOMS
SOAP MANUFACTURERS
SPECIALTY SHOPS
STUDIOS
SURGICAL ROOMS
TANNERIES
TAVERNS TELEPHONE BOOTHS
TELEPHONE EXCHANGES
TELEVISION STUDIOS
TEST CUBICLES
THEATRE LOBBIES
THEATRE LOUNGES
TOILETS
UNDERTAKERS
UNTIDY ROOMS - HOSPITAL
UNVENTILATED SPACES
VEGETABLE STORAGE
VESTIBULES
VETERINARY HOSPITALS
WARDS, HOSPITAL
WORK ROOMS
X-RAY DARKROOMS
YOUTH CLUBS
ZOOLOGICAL GARDENS

LOCATION "D"

AIR RAID SHELTERS
ANIMAL ROOMS
ATOMIC PROCESSES
BANK VAULTS
BIOLOGICAL PROCESSES
BOMB SHELTERS
CHEMICAL LABORATORIES
CHEMICAL PLANTS
CHEMICAL STORAGE
CHLORINE MANUFACTURE
COATING PROCESSES
COLLECTIVE PROTECTION SHELTERS
DECALCOMANIA PRODUCTION
EMBALMING ROOMS
EXHAUST HOODS
FERTILIZER PLANTS
GARBAGE DISPOSAL PLANTS
KITCHEN EXHAUSTS
LABORATORIES
LEATHER PROCESSING
LINOLEUM PLANTS
MEAT PACKING PLANTS
NEW PROCESSES
NUCLEAR PROCESSES
OILCLOTH PRODUCTION
PAINT DEPARTMENTS
POLLUTION CONTROL
PROJECTION BOOTHS
PULP AND PAPER PLANTS
RENDERING PLANTS
RESIN MANUFACTURERS
RUBBER PLANTS
SEWER VENTS
TAR PROCESSING
VARNISH MANUFACTURERS
VENT SYSTEMS
WASTE TREATMENT PLANT

APPENDIX 3

BOOK LIST

There are published annually many books of interest to those concerned with ecology, ecological illness, and ways of coping with such illness. The following list is highly selective, but represents a reasonable survey and includes some works which are standard in the field (indicated by an asterisk *). Most of the titles are available in public and university libraries, and the various branches of the Human Ecology Foundation of Canada also maintain small libraries. Many of the books may be purchased easily by mail from Dickey Enterprises, 635 Gregory Road, Fort Collins, Colorado, U.S.A. 80524, or may be ordered through a good book store. Reviews of new books appear regularly in the H.E.F. Quarterly, which itself constitutes an important source of information.

General

Dickey, Lawrence D., ed. Clinical Ecology *

Dickey, Lawrence D., ed. Clinical Ecology Procedures Manual

Environmental Health Association (Washington, D.C.). Manual for Those Sensitive to Foods, Drugs and Chemicals

Golos, Natalie and Francis. Management of Complex Allergies

Mackarness, Richard. Chemical Victims

Philpott, William and Dwight K. Kalita. Brain Allergies

Randolph, Theron G. Human Ecology and Susceptibility to the Chemical Environment *

Randolph, Theron G. and Ralph W. Moss. An Alternative Approach to Allergies

Speer, Frederick. Allergy of the Nervous System

The Family and Children

Blume, Kathleen A. Air Pollution in the Schools

Crook, William S. Your Allergic Child

Rapp, Doris. Allergies and the Hyperactive Child *

Rapp, Doris. Allergies and Your Family

Small, Bruce and Barbara. Sunnyhill: The Health Story of the Eighties

BOOK LIST

HOUSING

Pfeiffer, Gury and Casimir Nickel, eds. *The Household Environment and Chronic Illness* *

Zamm, Alfred V. *Why Your House May Endanger Your Health*

FOOD

Breneman, J.C. *Basics of Food Allergy*

Gerrard, John. *Food Allergy*

Hall, Ross Hume. *Food for Naught: The Decline of Nutrition*

Stoner, Carol, ed. *Stocking Up* (Rodale Press)

Albright, Nancy. *The Rodale Cookbook*

Human Ecology Study Group (Chicago). *Very Basically Yours*

Human Ecology Foundation of Canada (Hamilton Branch). *Cookbook*

Natural Cooking the Prevention Way (Rodale Press)

Rodale, J.I. *Encyclopedia of Organic Gardening*

Organic Gardening and Farming (Magazine)